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COMPUTER

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**EXPERT**  
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### Hardware shootout

Hot P4 motherboards  
Fast, fat hard drives  
Latest Palm handhelds

### Supercomputing

Attack of the teraflops

### Plus

Inside RF identification  
Extreme networking  
FireWire 800 tested  
Gaming on Linux

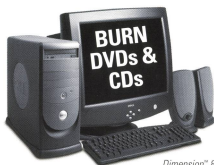
September 2003





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You can spend your time wading through tens of thousands of applications, utilities and programming tools — or just zone in on our expert's pick of the very best.

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## Hardware shootout

We put the latest hardware through the wringer every month in APC Labs.

This issue:

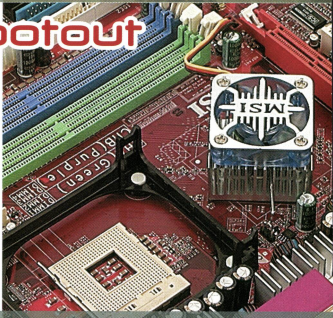
- 800MHz FSB motherboards for Intel's Canterwood and Springdale chipsets.
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## Reviews



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Windows 4.0

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LaCie Big Disk

Philips DesXcape 1500M

Corinex Intelligent PowerNet

Hyundai ImageQuest Q17

MAC Innovision 765



## Labs Challenges



### 800MHz FSB

### P4 motherboards

David Lin rounds up 15 leading contenders for your upgrade dollar.

Internal hard drives

Palm OS 5 handhelds

## Need to Know 17



- From November, Australia will be the first country in the world to get affordable 3G wireless broadband.
- Aussie businesses are suffering as the entire .com.au domain has been placed on an email blacklist.
- The issue of state governments using open source or proprietary software is being played out on a global stage.
- The I/O system is becoming a pivotal battleground as Intel and major vendors fight over 64-bit market share.

◀ With software companies arming themselves with controversial anti-piracy measures, it could be goodbye to the freebie. William Maher reports.

September 2003

## Workshop

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### Virtual Private Networks

Get secure access to resources on your home network.

### Windows file systems

FAT16, FAT32, NTFS: sorting out file-system confusion.

### Accessing partitions

Add support of other file systems to Windows' repertoire.

### Windows encryption

The secrets of system-level encryption in Windows 2000 and XP.

### Gaming with Linux

Moving from Windows to Linux doesn't mean a life without gaming.

### Packet-filtering firewalls

Setting up a packet-filtering firewall to share an Internet connection.

### Gigabit Ethernet

Lightning-fast home networks are now within reach.

### dHTML

Bring interactivity to your HTML code without leaving the text editor.

### Photoshop shape layers

Combine the power of pixels with the versatility of vectors.

### Programming with REBOL

Powerful multi-platform scripting for the masses.

### Handheld app replacements

Enhance or replace your handheld's built-in apps with turbo-charged versions.

## Techlife



### Games

Colin McRae Rally 3.0; F1 Challenge

'99 - '02; Star Trek: Elite Force II; WW2:

Frontline Command; Soldier of Fortune II: Double Helix.

### Books

Windows Server 2003 TCP/IP Protocols and Services; Mac OS X in a Nutshell; Macromedia and Adobe Web Packs; Linux Server Hacks; Web Services Security; Hack Attacks Testing.

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1 of 2

Canon LASER SHOT LBP-9410 colour laser printer

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SEE PAGE 96 FOR DETAILS

APC's privacy statement is on page 152.

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Access NTFS partitions from Windows 98

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## MegaPing 3.11

**Full version**

Troubleshoot your TCP/IP connection with this network monitoring suite. It includes all the utilities a network administrator needs. As sold for \$75, MegaPing 3.11 is free for APC readers. Upgrade to MegaPing 4.1 and receive a 25% discount.

**Valued at \$75**



When you see this CD icon in APC, it means there's bonus software on the cover CD set.



# Blue ribbon software

## Business

Our expert's top picks of business software begins on page 104, but we don't have room to include everything. So we're giving Mac users a chance to check out OpenOffice 1.0.3.1; the Windows and Linux versions were featured on our cover CD set in July, 2002.

## Utilities

This is the fun stuff! It's a grab-bag of goodies, from OS tweekers to handy tools for day-to-day tasks.

## Internet

Our experts have rounded up the best browsers, chat clients, peer-to-peer file sharing apps, FTP file fetchers, spam traps and email clients.

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## Ext2FS Anywhere 2.5

Need to access files on your Linux partition from within Windows? Paragon's Ext2FS Anywhere makes it possible. See our Workshop tutorial on page 126 for more details.



## NTFS for Win98

Windows 98 can't read NTFS partitions natively, but with Paragon NTFS for Win98 you'll be able to read files on Windows 2000, NT or XP partitions (see page 126).



## JBuilder 9 Personal documentation

Last month we gave you the full-working version of JBuilder 9 Personal for Windows. This month's CD includes all 70MB of the official documentation from Borland.



## Security

Don't take any chances trying out half-baked apps: armour your your network and your PC with our security picks. The list includes firewalls, anti-spyware utilities and content filters that'll keep the script kiddies, crackers and advertising brainiacs out of your PC.

## Multimedia

There's so much you can do with audio and video on your PC these days, so whittling the CD contents down to a good representation was tough. We've got video and audio editors, players, encoders and decoders plus simple and complex Web animation software.

## Development

Programmers all have their personal favourite platforms and tools and APC's not going to get into an argument with you. We've just singled out a selection of excellent code editors, the MySQL database, the VS.NET PowerToys plus specialised tools for Web development.

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• Special offer

#### MegaPing 3.11

— full-working version  
• MegaPing 4.1 trial version  
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SEPTEMBER 2003



After a long dry spell and a series of ho-hum results, things are starting to pick up in the PC market. It won't be a repeat of the boom days, but it's certainly more than a lull.

On the desktop side, buyers are looking to replace systems bought in the Y2K lead-up. The millennium bug is now a laughable memory, but it delivered a mighty spike in PC sales. Those systems are almost four years old, putting them into the use-by zone of most large companies, which set the typical desktop lifecycle at three to five years. The many small businesses that bought new PCs when gearing up for the GST, introduced six months after the bug that failed to bite, won't be far behind.

Even the desktop I bought new in mid-2001 is looking frayed around the edges. Early on I filled it to the gills with RAM, and last year dropped in a second hard drive, but you can only do so many upgrades before needing a totally new system. A desktop PC is steadily making its way to the top of my shopping list.

Of course, notebook sales continue to march north. Analyst firms Gartner and IDC pegged notebook sales in 2002 as accounting for about 22.5% of the total PC market, growing to 25% by the end of this year, buoyed by a number of factors.

Among them, there's the undeniable appeal of Intel's Centrino, which is smart technology, as well as canny marketing. Then there's the decreasing cost differential between the form factors; average desktop prices are actually creeping up because of the move from CRT monitors to flat-panel LCD screens. And big screen, high-performance "desknote" machines, driven by desktop Pentium 4 chips, or Intel's new Mobile Pentium 4, will continue to tempt those replacing their desktop.

P4-powered desknotes were the hottest-selling notebooks in the US last Christmas, and we'd be surprised if that trend didn't wash onto our shores this December.

David Flynn

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# need to know

News, views and analysis from the IT world

## iBursting out all over

Australia will be first in the world to get affordable 3G wireless broadband, with pricing close to ADSL. Dan Warne and Garth Montgomery report.

Sydneyers will be able to get 3G wireless broadband from November for about \$90 a month through the new iBurst network. It's a world first, and the company behind it, Personal Broadband Australia (PBA), owns enough spectrum to eventually cover 75% of the national population.

PBA plans to roll out to other centres in late 2004 — Melbourne, Brisbane, Canberra, Perth, Adelaide, Hobart and Darwin, in that order. iBurst is currently in trial with 500 customers, ranging from large corporations to individual residents.

A basic 500MB iBurst plan will have a dedicated 1 megabit per second (Mbit/s) downstream and 384 kilobit per second (Kbit/s) upstream per customer — faster than most ADSL services. APC has seen a demonstration of the technology in action: with the iBurst card slotted into a laptop, Windows instantly logged onto the network and played streaming video from

download rates produce the most errors, and then iBurst scales down to 756, 512 and 256Kbit/s as the signal declines.

### TELSTRA THREAT

Telstra is clearly worried about iBurst's affect on the broadband market. It threatens Telstra's wireless products and its monopoly on the copper customer-access network that largely determines ADSL pricing.

Telstra pre-empted iBurst's launch by switching on its Wi-Fi network, with hot-spots in hotels, airports and McDonald's restaurants. Ted Pretty, the telco's retail boss, headed off criticism about patchy coverage by saying, "It's not about coverage, but capturing the key market footprint for Wi-Fi activity — high-traffic locations." Access to Telstra Wi-Fi is priced at \$5 for the first 15 minutes and 20c per minute thereafter.

PBA said it aims to capture 20% of the



the iBurst cards will not be available at the time of the launch).

### WHY IT'S CHEAP

The low underlying cost of the radio spectrum iBurst uses and the unparalleled access the company has to mobile phone towers across

Continued on page 18

## World-first wireless broadband launch for Sydney

TheBasement.com.au with no lag or jitters.

An engineer involved in iBurst trials in metropolitan Sydney told APC download speed is tightly linked to signal strength, which varies depending on location.

"I was downloading a 7MB map of ski resorts from the Thredbo site at 110Kbit/s while driving down [Sydney's] Pitt Street," he said.

He reported that signal strength outdoors in the CBD was generally 100% at the time of testing, in late July, but indoors was a different story.

"I tested in Grace Bros and on one side of the floor I got 90% signal strength, then only 80% on the other side of the same floor. Inside a building there are so many structural interferences. Hopefully this will be alleviated with more antennae. But they can't sell this stuff and tell people it'll work for all indoor environments."

At least 95% signal strength is required to get 1Mbit/s, according to this tester. But faster

Australian broadband market with iBurst's "ubiquitous" coverage and affordable pricing. It's targeting two customer groups: the "broadband-deprived", with a lack of ADSL or cable infrastructure in their area, and professionals who would value broadband access wherever they were.

"An advocate in court could use iBurst to connect directly to the office LAN via VPN, and access databases as if they were at their desk," stated PBA marketing director John Filmer. "It's a technology that could change the way people work."

Small business customers with broadband connections at work and at home will be able to save money by combining the two and using a single iBurst service wherever they are, he explained.

Executives on the run will have fast access to email without the high charges of data through a Pocket PC (although CompactFlash versions of

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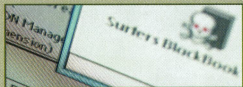
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APC readers have their say.





## Bouncing blacklist



**Australia is trying to get a block on its email domain name removed, but the American "rogue" behind it just won't play ball.**

Australian businesses are complaining that their trade is being disadvantaged by the appearance of the entire .com.au domain on a blacklist which is causing intermittent bouncing of email to and from .com.au email addresses. However, they claim, no-one seems to be doing anything about it.

The .com.au domain, along with those of many other countries, was recently added to a blacklist known as "RFC-Ignorant", used to identify top level domains that didn't follow the international standard RFC 954.

RFC documents contain rules produced by the international domain authority ICANN about the way the Internet operates. RFC 954 states that all domains must have specific contact information listed in case of problems.

RFC-Ignorant.org, a self-proclaimed "clearinghouse for sites who think the rules of the Internet don't apply to them", blacklists top-level domains that don't follow the RFC 954 international standard.

.com.au is listed because the Australian Domain Authority (auDA) recently removed much of the contact information for each

domain from public view, citing privacy concerns. But its actions have now set users, Internet activists and domain regulators at loggerheads over whose fault it was and what should be done.

Chief executive of auDA, Chris Disspain, said attempts to get the blacklist removed had been fruitless, and the only option those affected had was to ensure anyone they were writing to didn't use spam-filtering software that consulted the blacklist in question.

Among its victims, Queensland business TheDiscShop.com.au has experienced many emails to customers bouncing. DiscShop's Andrew Tranter told APC, "About half our customer emails are bouncing back, and our only option is to buy a US .com domain name — but we can't get anything remotely like our business name because they're all taken."

Derek Balling, who administers the New York based RFC-Ignorant blacklist, told APC that full contact information was important because if there was a problem with an Australian domain, a non-email contact was needed.

"When you're trying to report a problem with network connectivity, some out-of-band contact method is imperative," he said. "You need a phone number or, as a last resort, a mailing address."

auDA said it had been fully RFC 954-compliant ever since listing only email-address contacts for domain owners. In fact, ICANN was considering adopting Australia's initiative of listing only email addresses as the policy for all country domains, said Disspain.

He conceded Balling's point regarding the need for offline contact details, but accused him of being a "rogue" for blacklisting entire country domains. "There's nothing wrong with blocking an email address of a known spammer, but to block an entire country code is absolute nonsense. It's so far outside of principles of the Internet, it's ludicrous."

Balling said he was trying to use his blacklist to persuade domain administrators to do the right thing. "I can't make them do it, but their customers, who are inconvenienced by listings in our database, at least have the ability to deprive them of money by moving to other TLDs (top-level domains)."

Disspain said there was little he could do. "Anyone can set up a list that blocks certain domain names. It's not our responsibility to deal with that."

**Dan Wane**

 Continued from page 17

Australia are the key reasons the company has managed to keep charges down.

Australian telcos collectively coughed up \$1 billion for access to "paired" 3G spectrum for mobile phone use, but the iBurst service runs over "unpaired" 3G spectrum, which the Federal Government sold to PBBA for just \$9.5 million. The cheap spectrum enticed a powerful consortium of companies to put their financial clout together to form PBBA, including OzEmail, Vodafone, technology developer ArrayComm, and mobile phone tower provider Crown Castle Wireless.

Because Crown Castle maintains Optus' and Vodafone's towers, iBurst antennae can be installed on existing towers for extensive coverage, sidestepping the town-planning processes mobile providers normally face.

iBurst pricing will be tiered according to the amount of mobility a user needs, and sold through OzEmail, Vodafone, and other ISPs.

"An iBurst service that could be used in a set local area will cost only 15 to 20% more than a comparable ADSL connection," said

Filmer. "A fully mobile iBurst connection that could be used anywhere in your capital city, or indeed, anywhere in Australia, will cost more. But it will still be 50 to 100 times cheaper than using GPRS. It will be cents, not tens of dollars, per megabyte."

### UNPLUGGING YOURSELF

At launch, a Kyocera iBurst PC Card will cost about \$500, but prices will drop as other manufacturers, including LG, begin producing them. There will also be an external modem-sized USB device for desktop PCs.

Planned options include a flash-sized card for Pocket PCs and a combo Wi-Fi/iBurst PC Card for accessing both iBurst and an office network. PBBA intends working with laptop manufacturers to offer iBurst cards as a bundled option with their products, and hopes to launch an integrated solution similar to Intel's Centrino. iBurst cards transmit only when necessary, and PBBA claims that under constant use, they reduce the life of a single notebook battery charge by less than 20%.

The iBurst standard is proprietary but

Lucent, ArrayComm and Flarion are working on ratifying an IEEE standard called 802.20.

According to PBBA chief technology officer Jonathan Withers (an original contributor to the GSM specification), each iBurst base station has 12 antennae that measure each user's position every five milliseconds. With antenna receiving a fractionally different signal phase and time delay, the exact reverse characteristics of signals returned result in perfectly in-phase reception, even for users moving at up to 60km/h.

Unlike bandwidth-hungry mobile phone networks that beam signals in all directions at once, iBurst's network antennae aim each signal precisely. Such efficient spectrum use enables iBurst to provide service to a huge number of customers simultaneously, using a mere 5MHz of bandwidth. Each iBurst base station can service up to 2,000 users, and at launch, Sydney will have 20 stations.

iBurst's success or failure will come down to pricing models. If PBBA can avoid the pitfalls of broadband uptake that stem from high wholesale costs, adoption rates will likely soar. **ETTC**

# Pressure on public sector preferences

The issue of state governments using open source or proprietary software is being played out on a global stage.

A US lobby group's attempt to push the Australian public sector away from open source software has backfired by raising questions about the very existence of proprietary programs.

The Washington-based Initiative for Software Choice (ISC) is crying foul over the growing trend for governments to give preferential treatment to open source solutions. The group — which insists it is not opposed to open source but merely seeking a level playing field — has some powerful allies, including Microsoft.

At first glance, a pro-software-choice outfit and a company found guilty of anti-trust violation may seem strange bedfellows. ISC executive director Bob Kramer admitted that Microsoft was one of the driving forces behind his organisation's lobbying on the issue, and said the main focus was against preferential legislation of any kind, not just open source.

The issue came to a head recently in Australia when South Australian Democrat MLC Ian Gilfillan proposed an amendment to State legislation controlling software procurement. The amendment (in its second reading at time of going to press), stated that "wherever practicable, a public authority should use open source software in preference to proprietary software".

In his address to the SA Parliament, Gilfillan referred to open source as a "vast opportunity" for the State, flagging its cost, portability and accessibility advantages.

The ISC reacted at once. Kramer sent a letter to SA Premier Mike Rann expressing concern and asking that the amendment be rejected in the interests of avoiding "preferential legislation".

Gilfillan argued that the closed nature and prevalence of proprietary software was stymieing innovation. "We could see that the open source community was achieving good things but kept hearing about individual efforts being frustrated at the local level," he told APC.

"The intent of the [Procurement Of Software] Bill is to increase the profile of open source software. Government departments need to have good reason for buying proprietary software, rather than the old 'no-one ever got sacked for buying Microsoft' approach."

It was the SA Government's response to Kramer's letter that caused the most controversy.

"Our research to date shows that generally open source software is not yet seen by the marketplace to be suitable for fundamental business functions," Administrative Services Minister Jay Weatherill told *The Australian* newspaper.

The comments were at odds with the Government's previously stated support for open source, but the minister said they were taken out of context.

"It was responsive to a request about whether I was supportive of a stance in which we would have a preference for open source software. I was keen to convey that we didn't have a fixed view about open source or proprietary software."

"I was talking about some of the observations of global IT industry advisers had made about the maturity of open source software."

Analyst Gartner was the source of the information, Weatherill said.

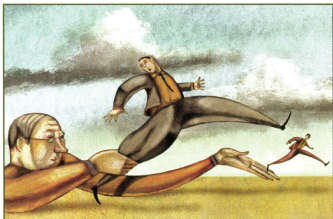
The SA Government had already taken steps towards the acceptance of open source, he said, including its use for "mission-critical" operations. "We use Linux and Unix for our Web hosting and some operational functions, so we're not opposed to it."

The minister shares the ISC's opposition to legislation making any form of software preferred over another, but concedes that open source use is growing. "The way the process works tends to mean that it is better placed to win [tenders]," he said. "It may be that open source software is the self-evident best solution. We won't be pre-empting the decision."

Meanwhile, sensing a winning issue, the Democrats were soon seeking amendments similar to Gilfillan's in the NSW and ACT parliaments.

A spokesperson for Gilfillan told APC: "The Bill does not largely eliminate proprietary offerings but does increase the incentive for those companies to consider an open source version of their product."

"The ISC letter does not make the 'open source equals anti-American' claim that other



lobbyists have put forward, but it is notable that many of the major players in open source software (Red Hat, IBM, etc) are US-based."

Coupled with Weatherill's statement that the SA Government was studying feasibility "in regard to the application on desktop and email usage", such sentiments represent an about-face for closed source software. The likes of ISC and Microsoft are becoming increasingly accustomed to such a reception. Redmond has dominated the desktop to date — one of its most prized markets.

When Telstra openly flirted with putting Sun's StarOffice on its 40,000-plus desktops, Microsoft CEO Steve Ballmer flew to Australia for talks with the telco.

**Justin Kranz**

## PC sales grow

Half-yearly PC sales have lifted Australian forecasts to double-digit growth by the end of the year. Mobile PCs, contributing 20% of total sales, are the key driver.

Desktop replacement cycles had driven demand, and wireless LAN, VPNs and lower prices stimulated interest in mobile PCs, said International Data Corporation (IDC) analysts.

IDC revised earlier PC sales forecasts for 2003 from 2.3 million to 2.5 million — up 13% year-on-year.

Computer-makers report sales approaching about two-thirds for desktops and one-third for notebooks, but revenue is starting to even up. In the next 12 to 24 months, mobile computing sales by quantity are expected to overtake desktop.

US makers are already reporting revenue tilting in favour of notebook sales, at 54%.

## Browsing gods and monsters

**When Microsoft starts charging for Internet Explorer, open source developers hope to make it pay a price of its own.**

With Microsoft's new browser strategy showing signs of holding the market to ransom, open source developers couldn't be happier. They see it as an opportunity to reach more consumers — those who will want to dump Internet Explorer.

In June, Microsoft dropped the bombshell that it would not offer IE free of charge after version 6.0 SP 1. Instead, customers will have to upgrade to the Windows "Longhorn" OS in 2005 to obtain an improved browser.

Meanwhile, Netscape has had its lifeline cut

by parent company AOL following a \$1.2 billion agreement with Microsoft. The cash payment — ostensibly over old legal proceedings — has AOL customers using IE exclusively.

Microsoft claims any further improvement of the browser requires complete integration with the OS. IDC analyst Joel Martin is one who doesn't agree. Microsoft is manoeuvring to avoid any future litigation from competitors, he said. "By making it a paid-for application [rather than a free download], no-one can argue it's not part of the whole Windows operating system."

Mozilla, which formed the core of the late Netscape browser, is happy, however.

"People say there's no innovation in the browser space, but that's only true if you're an Internet Explorer user," said Mozilla's self-styled "chief lizard wrangler" Mitchell Baker.

Mozilla offers conveniences not in IE, such as tabbed browsing (multiple Web pages can be worked on in one browser window), direct-type searching (simply type a word to search for it, without the need to open a Find dialogue box) and almost impenetrable security against Web bugs, scripts and spyware that rely on Microsoft scripting vulnerabilities.

In answer to criticism that Mozilla's browser has become unnecessarily large and feature-heavy, Baker says the group has refocused on development of leaner versions of its browser and email client, which will have to compete head-on with IE and Outlook Express.

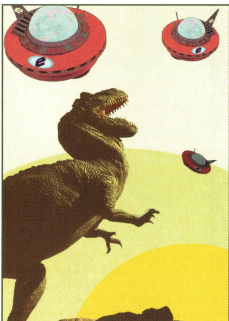
The new browser, Mozilla Firebird, and email client, Mozilla Thunderbird, are in the late stages of development and can be downloaded from [www.mozilla.org](http://www.mozilla.org).

According to Baker, the major barrier to Mozilla uptake is in making consumers and the industry aware that a good alternative exists. "Distribution is always key in the consumer market. Obviously Linux is one area, but there's a whole slab of people... who are becoming increasingly wary of being drawn into the Microsoft realm of complex proprietary systems and ongoing licence fees.

"Microsoft got its browser monopoly by pursuing illegal, anti-competitive activities. But there is a superior alternative," she said.

The Mozilla Foundation will work with governments worldwide to help educate their constituents on their open source options.

But Baker admits that distribution of the browser is a tough nut to crack, considering IE



ships with every version of Windows, and PC hardware manufacturers won't talk to Mozilla about distribution arrangements.

Independent Australian analyst Bruce McCabe agreed. "It's not that people don't like the idea of an alternative to Microsoft, because they do," he said. "It's more that people feel they will have less hassles and hang-ups with IE because they have heard that many Web sites rely on Internet Explorer for correct rendering."

Baker refuted the claim. Mozilla has worked directly with hundreds of the most popular Web sites worldwide to ensure its code is standards-compliant, she said.

"There was a very significant effort to go to companies using IE-specific code — predominantly Internet banking providers — to help them rewrite the sites so they would be standards-compatible. It had dramatic results. Only a tiny fraction of major sites are still IE-dependent."

The Mozilla Foundation is working to make it easier for businesses to get actively involved in the development of its browser and accompanying email client. Tech-leaders such as Sun, IBM and Red Hat plan to continue supporting Mozilla due to its importance as the leading browser for Linux, Baker explained.

With US\$2 million in hand as a severance sweetener from AOL, and a team of 10 decision-makers to run the Foundation, Baker is confident Mozilla will present a cohesive face to business and consumers in the years to come.

**Dan Warner**

## Next patent, please

Over the years, attempts to patent widely-used technologies have been amazing: ecommerce, the GIF image format — even hyperlinks. And they're still trying with the following:

**Internet auctions:** eBay has survived an attempt to patent online auctions but copied a US\$35 million damages order over the "Buy It Now" feature that lets bidders make immediate purchases.

**Windows security:** You can't help but admire the sheer ambition of InterTrust, which claims that 85% of Microsoft's software is infringing on patents for its anti-piracy technology. The claims passed muster (and raised many an eyebrow) in preliminary court hearings, so the fight continues.

**Fast user switching:** Microsoft has had it since Windows XP, but it turns out that as long ago as 1995 Apple filed a patent on what some say is a similar concept. No word on any patent battle, but the Mac camp recently applied to continue the "multiple personas" patent.

**Personalised Web shopping:** Amazon tries to customise suggestions to shoppers based on their past purchases — a neat idea, but another party is claiming dibs on the concept.

**Web ad auctions:** Amazon has made its own claim on the idea of having Web advertisers bid for space on Internet sites. With Net ad dollars down, it's not surprising.

**Ecommerce:** Every man and his dog has had a crack at patenting e-business. We can't fault the effort of a Canadian outfit reportedly on a 26-country campaign to register its claim.

**William Maher**





## Exchange: **Alastair MacGibbon**



**Police are swapping guns for modems, but can they do anything about Net crime? We spoke to Australia's chief cyber-cop, federal agent Alastair MacGibbon.**

With Net surfers falling foul to fake Web sites, online scams and auction fraud, the police are under increasing pressure to prove they've got a handle on high-tech crimes. Over the next year, at least \$4 million will be spent funding the new Australian High Tech Crime Centre ([www.ahctc.gov.au](http://www.ahctc.gov.au)), a hub for coordinating and investigating complex online investigations with police cyber crime units around the country. Alastair MacGibbon is its director. Instead of guns and drugs, his team is being trained to deal with identifying evidence potentially contained within racks of ISP equipment, to monitor chat rooms, and to investigate Web site attacks. But putting the hype aside, will they make a difference?

### **You say people have been reluctant to report Internet crime to police. Why?**

*There are several possible reasons for that. One is that victims may think that police aren't interested. Let me say now that policing agencies are interested in these types of crimes. There's a potentially a belief that justice won't be reached by reporting matters to police... and it may well be that even when crimes have been reported to police, there's been an inability for police to actually proceed to arrest, because of the standard of [digital] evidence that's been available to us.*

*So that might then generate a belief that we're either not interested or incompetent to actually conduct the investigations, neither of which are true. I would say it's the opposite. But we need to break that down, that potential barrier. We are trying to address that.*

### **But aren't you hamstrung because the servers are overseas? Don't the laws need changing?**

*We have to be careful that we see law as being the answer to all problems. There are a range of factors here. How can you legislate things that are offshore? You have to also recognise that whenever you do take an inquiry offshore you automatically reduce the amount of control you have over that matter. We don't pretend that inquiries that are conducted offshore with our partner agencies are always going to be easy.*

**Despite all this high-tech policing, aren't an**

### **increasing number of people falling victim to bogus Internet auctions?**

*We also say that we will never remove crime on the Internet. There will always be victims. But, if I think that I'm making really, really good money by selling something online, and they don't pay me, then maybe I should have known that a normal person wasn't going to offer that amount.*

*I'm not trying to lecture people. What I am saying is that people need to ask themselves the same questions online as they would in the real world. Is it too good to be true? It's a simple message and frankly it's one that would be quite effective in a range of the frauds that we see.*

*There are other things people can do protect themselves in relation to online frauds, such as use of an escrow service, or use of a legitimate site that provides insurance.*

*They should go through auction sites that say they cooperate with police and where data is shared with police.*

*They should also notify police. We need to get a better idea of [how many] incidents are happening.*

### **But isn't it easy for people to hide their identity online?**

*We don't subscribe to the fully anonymous view of the world. Criminals are less anonymous than they often think they are. They can either make mistakes or there are lawful ways that we can go about obtaining appropriate data. Criminals should know that we can track them down...*

*CLU [Caller Line Identification, a method that allows police to trace phone numbers of customers dialling in to their ISP] is one of the investigative avenues we have available to us, but there are a range we can employ. Some are easier and some are harder.*

### **What are these other "avenues"?**

*That goes into the methodology of how we conduct our investigations. We would generally be loathe to say anything more specific about what we do. We do go to ISPs and telecommunications carriers, logically... it's all done using lawful mechanisms.*

### **What about offshore free email accounts?**

*We're looking at engaging, and we have been engaging, major ISPs who have offshore servers*

## Is it legal to . . .

**remove copy protection on software you have paid for?**

*It seems like a reasonable enough proposition. If you've paid for a software product, you should be able to bypass the CD-check/product activation/annoying anti-piracy features, right? Wrong — most times, anyway. It all comes down to the EULA (End User License Agreement). And rare is the EULA that doesn't make specific mention of "reverse engineering". Running software cracks is regarded as altering the intent of the software, even if you have paid for it.*

*to see if there are ways we can apply Australian laws to lawfully obtain information relevant to the users of those accounts.*

*I think I've been misattributed with some statements in relation to trying to get rid of free email accounts. What I said is that I'd certainly like to be satisfied that we are able to get access to the data we need.*

### **What about fake Web sites?**

*We've certainly been involved in investigations of the Web site scams for the banks. We may or may not get involved in another similar types of incidents. It depends on the nature of the jurisdiction where the events occurred, where the victims are, and how large the problem is.*

### **Will you investigate online music piracy?**

*If it's a matter that's serious and complex and multi-jurisdictional that does an identifiable damage to the industry, then we may consider it. But we need to be reasonably strict on the matters we take on board so we don't end up offering services we can't uphold.*

### **How technical are police? Do all your agents have formal IT qualifications?**

*No, not necessarily. We have people with formal IT qualifications and we have people who don't.*

*A lot of this stuff, particularly from a policing point of view, was self-taught by [police staff] because they had an interest in it. Some have got formal qualifications, some are obtaining them, and some may never have them...*

*We would expect them to have ability in... network security, possibly encryption, possibly an understanding of certain types of programming that are rarer than others.*

*If we don't have the skills we'll find someone who does — people seem to forget that first and foremost we're a law-enforcement body.*

# Piracy battle rolls onwards

**Pirates and record labels working together?  
Don't hold your breath.**

New statistics show music piracy is bigger than ever, despite Telstra planning to join the ranks of online shops selling legitimate music downloads.

File-trading and CD-burning has become almost second nature for many Australians, with local music industry body ARIA estimating that around 3.6 million Australians have illegally burnt a music CD over a six-month survey period, whilst 3.4 million illegally downloaded music from Internet file-sharing networks.

File-sharing and CD-burning is most popular with the under-25s — 40% had burnt a CD in that period, and 26% had shared files online.

All this is a dampener for the growing number of legitimate online music shops, and for Telstra's reported plan to sell singles online for up to \$2 by the end of the year, following the phenomenal success of Apple's US store, iTunes.

Despite their increasing number, there's no sign that legal music-download shops are making the anti-piracy fight any easier. At the same time as iTunes raked in US\$6.5 million in the four months since its April launch, copyright

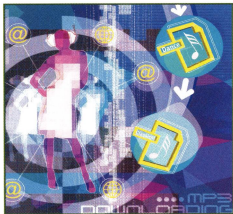
owners have also been busy outlawing illegal CD-burning and file-trading.

Australian efforts to investigate alleged piracy on university networks has lost momentum, however. Anti-piracy investigators were initially refused access to files by three universities — which cited privacy concerns — and were then told later that the evidence had been deleted.

File-trading networks are also exploring new ways to help users stay anonymous. A new version of Morpheus attempts to help people hide their identity by channelling illegal file uploads and downloads through a proxy server.

Much of this is in response to a campaign by the American record industry to issue more than 900 subpoenas to ISPs to find the real names of file-traders behind usernames. Australian authorities claim they'll also be going after the file networks, but reportedly will target people with tens of thousands of illegal tracks, not those downloading the occasional song.

Laws have even been proposed in the US which outlaw illegal file trading. The "Author, Consumer, and Computer Owner Protection and Security Act" includes a five-year prison term and fines of up to US\$250,000.



The early success of iTunes has sparked a wave of new licenses for legal online music downloads. But there's still no sign of the service here, with the market left to hopefuls like KaZaA and Destra, the owner of mp3.com.au. Destra already distributes music online to Australian radio stations, and is reportedly in talks with major labels for a consumer service.

PC owners are also waiting for their version of iTunes promised by Apple boss Steve Jobs. With only 3% of computer owners serviced by iTunes, it can hardly yet be said to be a revolution in online music. Until that time, piracy battles look certain to continue.

**William Maher**



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# Blazing boards a mother

**The new high-speed motherboards can be surprisingly picky with extra RAM.**

New high-speed motherboards are increasingly the cause of compatibility problems. Some frustrated early adopters don't realise they won't work properly with the old RAM they have, and the boards can even reject seemingly suitable RAM.

PC vendor Plus Corporation reports that phone calls about compatibility are up 25%. "That's probably the more frustrating thing. They're putting in RAM that really shouldn't work in that board," said managing director Nigel Fernandes.

Causing much of the confusion are motherboards with the new 800MHz system bus, which is set to become standard in chipsets from Intel and others for the next few years. The bus requires dual-channel RAM that works at 400MHz, but reportedly won't work properly with memory designed for older 333MHz boards.

The new boards should be able to work with this older RAM, but in reality it's not so easy. Even clocking-down the memory bus isn't enough to get older memory to work.

The compatibility issue is nothing new, but experts say mixing and matching parts has become more complex with the rapid change in CPU and bus speeds. The higher speeds mean extra care must be taken when tweaking

settings such as memory timings and voltages.

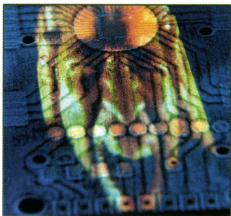
Queensland retailer Computer Alliance went through five or six types of RAM before finding brands stable enough for customers with the new high-speed boards. In several cases, even correctly-rated memory chips failed tests.

"I'm sitting here looking at three boards that got blown up in testing, trying to get stuff to work," said sales manager Ian Erbacher.

Problems are also in store for those trying to get new memory to work with their older boards. "There are a lot of problems with RAM out there — just matching it up," said Erbacher. "We have the higher-end boards sussed now and can sell with confidence, but boards earlier than six months ago... it was a bit of a lottery."

The problem should subside as 800MHz becomes standard. Numerous types of memory speed have been introduced over the years, from PC2100 up to 3200, and so on. In addition, there are three different types of memory: SDRAM, RDRAM and DDR RAM.

"It's a lot different to 10 years ago when you had one motherboard and one chipset," recalled IDC analyst Graham Penn. The speed war between AMD and Intel means that chipsets now have a lifecycle of three to six months, he said, with older components becoming obsolete increasingly rapidly. There's little chance of finding spare parts for three- or four-year-old machines, even from brands such



as Dell and HP.

PC owners are now being encouraged to buy complete upgrade kits, including memory, CPU, motherboard and power supply, instead of parts. "It's the same thing in the car industry. If you want new reflectors, you have to buy a whole new assembly," Penn explained.

Yet retailers report that users upgrading or building a PC often hunt and peck, scouring the Internet for the cheapest prices on parts.

"If you're \$5 dearer on one item, people will drive 40kms to buy it from someone else," one vendor said.

But not everyone is so dedicated. According to Computer Alliance's Erbacher, compatibility problems mean more people are opting to avoid all the hassle by buying a whole new machine. "RAM is so cheap now. A lot of people are saying, 'Bugger it. Just build me a new box.'"

**William Maher**

## Data Dump

Number crunch

Amount of money Hollywood will spend on data storage (Source: News.com)  
2003: US\$5500 million      2006: US\$675 million

Estimated wireless hotspots around the world (Source: Gartner)  
2001: 1,200      2003: 9.5 million

Australian Hotmail users who have paid for larger inboxes:  
7,000

Australians who burned a CD during a six month survey period:  
3.6 million (Source: Quantum)

Australians who logged onto Net dating sites in Q1 2003:  
900,000 (Source: Jupiter)

# \$761,448.50

The amount two Sydney men convicted of video game software piracy must pay to Sony; it's the highest figure ever awarded against game pirates in Australia during Sony's ongoing anti-piracy crackdown. And a Melbourne man has been sentenced to a year-long jail term for the sale and distribution of pirated games.

Quote file

## "We would prefer licensing to litigation."

Of course SCO chief executive officer Darl McBride would. The company alleged that all commercial Linux users are software pirates using misappropriated SCO-owned code in Linux kernel 2.4. He announced that SCO would offer a new licence to protect users from forthcoming legal action by the software maker.





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# Weapons of mass restriction

**With software companies arming themselves with controversial anti-piracy measures, it could be goodbye to the freebie. William Maher reports.**

Start saving your cash because it seems that sharing a friend's software CD or installing a second copy of a program on a PC at home will become increasingly difficult. Software activation is going mainstream. Several major vendors following Microsoft's anti-piracy lead and many insiders believe it's the way of the future.

The list of products requiring compulsory activation, which gained notoriety with Microsoft's Windows and Office products, has expanded to include graphics programs from Adobe and Corel, a Macromedia Web publishing program, Quicken accounting packages and all of Symantec's forthcoming Norton 2004 range.

"In a couple of years activation will be commonplace," predicts Macromedia's Eric Larson. Representatives from Corel, Symantec and Quicken agree that PA could become the rule, not the exception.

When Microsoft rolled product activation into Windows XP and Office XP, the outcry was fierce. Many buyers were angered by the prospect of having to make phone calls or go online to make legally purchased software work. Nevertheless, amid the worldwide epidemic of illegal sharing of programs and product keys, other companies have warmed to the concept.

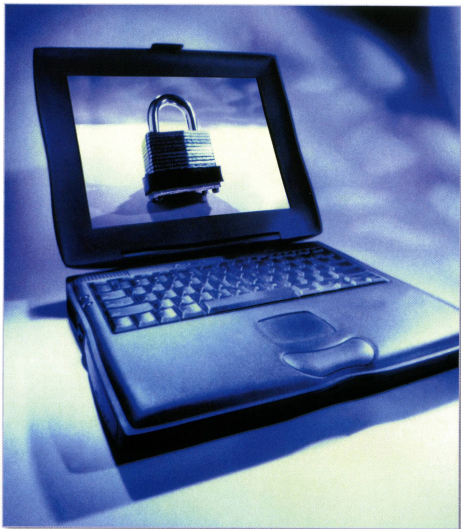
## FINDING YOUR KEYS

With activation, a copy of the software is tied to a particular machine to prevent the same product key being used for installs on several PCs. For the software to work properly after installation, an additional key or code is needed from the vendor.

Following Symantec's assessment of product activation, which included a local trial of 3,000 copies of Norton AntiVirus 2003, the company has built activation into all products in their Norton 2004 line.

Macromedia has begun testing with Web publisher Contribute 2, although it won't comment on its intentions. Reckon is pressing ahead with compulsory activation of Quicken despite parent company Intuit saying it will drop the technology, after US customers sued. Corel is evaluating what is says is the same activation technology Microsoft uses.

"Most vendors are either trialling it or looking at it," says Corel's Asia Pacific director, Gavin Watson. "A lot of vendors like ourselves are



saying, 'Let's trial it and see what the response is like. Let's see what it actually does to sales.'"

Tougher, more hack-resistant versions of the technology are emerging. Queensland-based XstreamLok's Xlok aims to foil hackers by preventing reverse engineering of its code.

Xlok is a hush-hush affair. So much importance is being paid to anti-piracy measures that the company is reluctant to talk about what software it protects. A handful of large companies are interested, says XstreamLok chief Matt Crump, but "being security, it's a very touchy issue."

Crump keeps a close eye on the Xlok demos

given to testers. "We don't want every man and his dog requesting trials so they can pull it apart and figure out how it works."

## LOOPHOLES AND LEAKS

Ways have already been found to get around product activation. Licence keys for bulk business installations, which don't require activation, are the big loophole in Microsoft's scheme. Keys of this type for Windows XP and Windows Server 2003 have leaked onto the Internet, and some IT staff in large businesses have taken the non-locked versions to install at home and share with friends. There's not a lot

that can be done, apart from ensuring upgrade patches won't work with leaked keys.

The other battle will be to counter common myths about copying. Consumers don't own software when they pay for it; they buy only a licence to use that copy of it. In most cases this means an installation on one machine, although sometimes a second install is allowed.

"The people who get most upset [about activation] are the ones who buy a single software licence," says Crump. "They think they're doing the right thing by paying for it, but they install it on their work machines and their home machine and their notebook. This sort of software stems them from doing that."

This domestic "casual piracy" is the prime target. Symantec says most of the boxes sold to consumers, so that's where vendors are focusing their energy. Symantec plans to introduce multiple-user license packs at the retail level for many Norton 2004 products.

The company, which believes its Norton consumer product is the second most pirated software in the world, will limit its product activation to the consumer sphere.

The focus on home copying is unfair and the companies should be targeting commercial counterfeiters, argues Charles Britton, of the Australian Consumers' Association.

"To us, piracy is not a very useful term. You've either got some degree of consumer copying, which, particularly with music CDs and backing-up software, I think is entirely non-problematic. And then you've got commercial counterfeiting, which we agree is entirely a problem and needs to be controlled.

"But you don't control it by locking up all the consumers. You're burdening people with loops and hoops to jump through to cure problems that are actually often in a different space."

#### NO BIG BROTHER

To some extent, worries about activation hassles have been allayed. Independent reports show that despite initial concerns, most people don't expect the practice to be a major headache. Vendors are at pains to make clear there is no big brother conspiracy going on. They assure that names and addresses aren't being passed on when people authenticate their software.

## "A lot of vendors like ourselves are saying, 'Let's trial it . . . Let's see what it actually does to sales.'"

Microsoft and others have learnt from initial criticisms and given more leeway to the number of components that can be changed on a PC before software must be reactivated. Systems such as Xlok are making the process easier by handling authentication automatically.

But what if the technology is used everywhere? That would potentially be a big headache for consumers, says Britton. "As it becomes ever more popular and smaller players see it as some sort of magic bullet, then you're going to have everybody piling into it. I don't think there's a guarantee that everybody's going to be as [careful] in their use and their methods of activation."

It's also possible that the technology could evolve even further, increasing the level of monitoring once software is brought home from the shop. PC owners are going online only for the initial activation, but software could be made to check online regularly to confirm that the owner's licence is valid.

Vendors say such tight monitoring is unlikely, but Xlok is already being set up for tomorrow's online databases through which rental or subscription software licences could be checked yearly, monthly or even daily.

"We're planning for the future," says Xtreamlok's Crump.


#### IN THE CULTURE









It's hard to see consumers swallowing this vision easily. For decades they have shared disks with friends, downloaded serial numbers from the Internet and laughed at software licence agreements. In the tech community, illegal copying is ingrained in the culture.

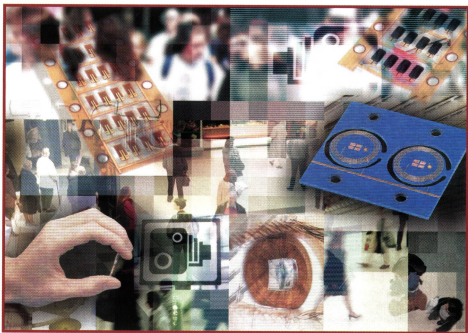
While Microsoft and other big names write out increasingly elaborate "Click Yes to Agree" clauses, it's been of no consequence to the hordes of people in homes and offices who simply ignore them and install on as many machines as they like.

Britton argues that as activation becomes more widely used, the consumers to be inconvenienced will be the legitimate ones. He predicts the same wave of concern that has followed the recording industry's crackdown on ripping MP3s from store-bought music CDs.

"People feel that if they've forked over hard-earned brass, they have the right to control what they've got," he says.

"I guess they get concerned when they see that right ebbing away." 

Vendor	Activation ties software to individual PC?	Which software?
Microsoft 	Yes	Windows XP, Office XP, Windows Server 2003 and others.
Apple 	No	High-end tools require registration; not machine-specific.
Symantec 	Yes	All consumer products in the Norton 2004 range.
Macromedia 	Yes	Trialling Contribute 2.
Reckon 	Yes	Quicken.
MYOB 	No	Registration required; not machine-specific.
Corel 	Yes	Trialling Director 10.
Adobe 	Yes	Trialling Photoshop 7.



## RFID Big benefit or Big Brother?

**Microscopic identification tags enable tracking of anything from cans of soft drink to railway cars — and people. David Braue looks into RFID technology's huge potential and why it's still years away from making a difference.**

Got a favourite place to shop where you think they know you well? No matter how good the service, you'd be hard-pressed to find someone that knows as much about you as the robotic system that greets Tom Cruise's character in last year's sci-fi hit *Minority Report*. In that film, a quick retinal scan as he walks through the door enables the computer to greet him by name and ask how he enjoyed the clothes he bought on his last visit.

True, the computer gets the name wrong — but that's because the character has borrowed another person's eyes. Those same eyes serve as his identification throughout his futuristic surroundings, where ubiquitous eye scanners track the movement of people leading everyday lives.

Ocular transcripts may still be science fiction, but another, increasingly real technology could soon make it just as easy to follow products, equipment and people as they travel. The key is not a body part but a pinhead-sized RFID (radio frequency identification) microchip paired with a coiled antenna that can be embedded in

clothing, on product packaging, inside cars, or just about anywhere else.

### PULSE STREAMS

RFID has two main elements: an RFID tag, and a reader for communicating with the tag. Tags include the coiled antenna, and a microchip on which information is stored.

The RFID readers send out continuous streams of electromagnetic pulses. Early tags use the 915MHz frequency band, but the 13.56MHz spectrum is gaining popularity as a standard. When a tag comes within range of a reader, it uses the energy from the pulses to broadcast its contents.

In its simplest form, an RFID tag contains only a unique number, which acts as a serial number for the item the tag is attached to. Such "passive" tags struggle to communicate over distances of one metre, but the addition of a battery — creating an "active" tag — increases transmission range to several dozen metres.

Early RFID tests stored all sorts of data on the tags, but standardisation is underway. At the inaugural EPC Executive Symposium in Chicago this month, the Auto-ID Center ([www.autoidcenter.org](http://www.autoidcenter.org)), a consortium of interested parties which has become a focus for RFID development, will debut EPCs (electronic product codes), a numbering scheme that constitutes the biggest revolution in product tracking since barcodes.

### NUMBERING EVERYTHING

EPCs are comparable to the UPNs (universal product numbers) hidden in the printed barcodes found on almost everything you buy. The UPN describes the manufacturer and type of product, but EPCs are much longer at 64- or 96-bits. They can respectively store numbers from 0 to 18,446,744,073,709,551,616 and 0 to 79,228,162,514,264,337,593,543,950,336, which is enough to give a unique serial number to every object ever made.

That raises interesting possibilities. For example, a soft drink manufacturer could assign a unique EPC to each and every can of soft drink it produces. EPCs on confectionery bars would allow a chocolate maker to know the exact location of the bar that includes a winning competition ticket.

"The Auto-ID Center's concepts are the natural successor to the barcode," says Peter Cole, professor of RFID systems in the Department of Electrical and Electronic Engineering at the University of Adelaide. The university last year established one of five international Auto-ID Center research affiliates.

"The centre has been focused on ways in which the cost of RFID can be reduced, and [in Adelaide] we've developed some ideas to improve signalling within electromagnetic compliance regulations."

These days products come out of factories on pallets and are delivered in bulk to distribution warehouses, where they are then trucked to retail stores to be bought by consumers. Barcodes on product cartons are scanned on arrival.

But if a box contains more than one type of product, it must be unpacked and sorted manually.

With RFID tags, all this is history. Because radio signals penetrate packing materials, a warehouse can automatically check which specific products have arrived, then determine exactly which row and shelf the box is destined for.

If those shelves had RFID readers, they could automatically poll surrounding products to conduct instant inventories. And because the process doesn't require items to be physically moved past a scanner, RFID allows self-checkout.

A reader can capture the codes on each item in your shopping cart, then ring them up without forcing you to remove them.

RFID isn't just about serial numbers. The hierarchy of tags includes: simple EPC-only tags; long-range battery-powered tags; tags that can be written to; tags that double as security tags using a single bit that's reset when a product is purchased; and tags that are paired with sensors to record temperature, humidity and other environmental details the products could be exposed to during transit.

Since this information can be easily read, a grocery chain could use it to automatically cull products that may be spoiled—for example, a carton of ham that was left on a hot loading dock for too long.

#### MARKET PENETRATION

RFID faces the massive obstacle of getting companies to actually use it. The technology requires manufacturers to add tags to products, and distributors and retailers to install readers throughout stores and warehouses. So far only a few manufacturers (Gillette, Procter & Gamble, Philip Morris, Volkswagen) are experimenting. Everyone else is watching and waiting.

Cost is the biggest problem. RFID tags start at a few US dollars each, but this will take years. The Auto-ID Center's stated target is to produce tags for US5 cents each, but this will take years.

In the meantime, tentative tests from companies such as US retailer Wal-Mart, which this year signalled its support for RFID after an extensive trial, will define retail usage. Expect RFID to initially be used for tracking higher-value items such as cattle (see "Until the cows come home," right), where the cost of tags can be justified by time savings and improved information delivery.

"We specifically work in harsh or industrial environments where barcoding doesn't work," says Amskan managing director Andrew Hackett-Smith. "We're continuously getting a lot of interest, but it comes down to the cost of a tag. If you want to buy 1,000 or 10,000, the projects don't stand up."

That hasn't stopped visionaries like the Accenture consultancy, a strong RFID proponent, from dreaming up uses. Its researchers' ideas include the Online Medicine Cabinet, which uses face recognition to identify individuals and then uses RFID to track which medicines they are taking. Or there's the Online Wardrobe, which scans RFID tags on clothes to keep track of what's in your wardrobe, then suggest ways to mix and match according to your daily schedule.

Sydney's Star City Casino uses a derivative

of that idea to slash the cost of cleaning nearly 5,000 employee uniforms every day. The casino has embedded RFID tags in the waistband, shirt tail or collar of its 80,000 uniforms (worth nearly \$2 million) so each can be tracked through laundering. The system has helped Star City increase the accuracy of cleaning contractors' charges and reduced the uniform replacement rate to 7%, compared with industry averages of around 20%.

#### PRIVACY WORRIES

RFID tags' ease of use concerns privacy advocates who worry that they could track consumers' movements any time they pass publicly installed readers. It would be *Minority Report* without the eyeballs.

Such concern has made experiments with the technology difficult. Benetton, for one, copied global criticism when it considered RFID-tagging garments so they could be sorted in the supply chain without opening shipping boxes. The company quickly moved to clarify that it was still assessing the technology.

Privacy concerns recently led the Auto-ID Center to devise and introduce a "kill switch" by which stores can disable RFID tags once a product has been purchased. Such concessions will be crucial for consumer acceptance.

Despite a few isolated applications, RFID is still a novelty in this country. Even though customers like what they see, Tony Edwards, an industry consultant with barcode and RFID scanning equipment supplier Symbol Technologies, concedes it will be some time before RFID comes into its own here.

"We've been presenting it to a lot of companies totally unaware of it," says Edwards, who recently began demonstrating temperature-sensing RFID tags to Symbol customers. "They're very interested, but it doesn't fit in with current priorities."

#### ITEMS IN TRANSIT

Because the economics of RFID usage in volume don't make sense yet, Edwards thinks the tags will first be used to attach maintenance data or environmental conditions to items in transit. Tags on train engines and rolling stock, for example, would let engineers instantly gain access to their maintenance history without having to sort through wads of paper.

Strong industry support means that the introduction of RFID is inevitable. The question is, how long will it take?

One day, we'll find that "intelligent," self-describing products have become part of our everyday lives. *Minority Report* will be in the majority, after all. **ETI**

## Until the cows come home

If counting livestock is the way to get a decent night's sleep, there can't be many farmers with insomnia.

But they do have other problems, such as keeping track of herds that graze over hundreds of hectares, put in regular appearances at milking sheds and weighing stations, and ultimately go up the ramp at the abattoir. Farmers usually funnel the animals through narrow spaces so individuals can be monitored and their weight, medical treatment, pregnancy and other features recorded according to a numbered ear tag.

But tags get muddy and fade, they can break or fall off, and after hours of squinting to read one tag after another, human error can creep in. Fatigue and illegibility contributes to error rates of up to 20%, says Ken Evers, production administrator with RFID supplier Aleis International. This affects farmers' ability to meet increasingly strict livestock management guidelines, particularly when supplying meat to strictly regulated overseas markets.

Enter RFID. Aleis' founder, a Queensland cattle farmer, designed and patented an RFID antenna called StocTrack that increases the accuracy of monitoring waterproof plastic-coded tags attached to cows' ears. Bovine-scale gates have RFID readers for counting the animals as they pass through sections of the farm, onto trucks, and so on.

Tags can also be encased in ceramics and fed to the animals so they sit, undigested, in their stomachs for lifetime tracking.

"Some cows live 20 years, and with RFID they're always identified," says Evers. "When an animal comes into the yard, the system brings up its records. You can see straight away how its weight has changed, and you can get rid of poor performers and optimise your stock."

Aleis has installations at dozens of cattle properties and saleyards across NSW, Queensland, Victoria and Tasmania as well as New Zealand, Japan, the United States, Canada and other countries.

It recently won a tender for more than 600 RFID readers for cattle farmers in Botswana, and the orders keep rolling in.

"Many people who have bought this system have worked out ways to increase their profits by 25% just by knowing what's going where and which animals are and aren't doing well," claims Evers.





## The fudge factor

**Hardware manufacturers and system builders use benchmarking to show how well their products perform, but the figures aren't always what they seem.**

**W**hen Apple claimed the Power Mac G5 was the "the world's fastest personal computer", I thought, "Yeah? Prove it." Check out the company's Web site and you'll see that an Intel Pentium 4 system outperforms the G5 in the single-processor, integer-operation SPECint\_base2000 benchmark.

This test represents the types of processing most single-processor machines do, and it's the only processor-based result relative to the majority of PC users. Interestingly, a 3.0GHz P4 chip was used and not the faster 3.2GHz, even though it's been available for months.

How can anyone say they have the World's Fastest PC crown without testing against the fastest gear available from the competition, or proving dominant performance in the most common type of processing task?

The methods of Veritest, the independent company Apple paid to do the tests, are also relevant. Its report says the MalloC Library IEEE was used when compiling the G5 benchmark, along with a relaxed IEEE math option.

But benchmark compiling under the Intel platform included neither, giving the G5 a slight advantage under floating-point unit tests. Compiling benchmarks using different settings on different platforms will never result in a level playing field. It's comparing Apples to oranges.

Furthermore, Apple's own testing produced the application benchmarking results published on the site, and all application software was "optimised for the Power [Mac] G5". But there are

car before a test drive. But it started getting dirty when hardware manufacturers jumped on the bandwagon. ATI and nVidia have been busted for "optimising" their drivers to perform better under specific synthetic benchmarks.

I use that term loosely. Many people argue that reducing the render quality of the images displayed specifically in benchmarks to attain higher frame rates and higher scores constitutes cheating because the tests no longer show exactly what the hardware is visually capable of.

And there's more: MSI introduced DOT (dynamic overclocking technology) on its 865 Neo 2 motherboard, but didn't tell anyone. Reviews were published showing higher benchmark results than for rival boards. After the use of DOT was discovered, MSI cited patent application as the reason why this "feature" wasn't announced upon release.

In the CPU arena, AMD has regularly used benchmarking figures to justify its controversial performance ratings figures.

Nowadays, vendors and manufacturers use benchmarking more as a marketing tool than for comparing performance. But you can make a benchmark say pretty much whatever you want, depending on how you run it. As long as companies use differing methodologies between products, or implement arguably deceptive practices, consumers are never going to trust such figures as a basis for comparison.

If consumers make purchasing decisions based on marketing mumbo-jumbo, it could be argued they are being deceived. If this is allowed to continue, consumer confidence in the benchmarking figures

## Compiling benchmarks using different settings on different platforms . . . It's comparing Apples to oranges

no details about how, or if these "optimisations" were replicated across other test platforms. The G5 is no dog, but the value of using benchmark results to promote a product has to be questioned when the published results, under close inspection, appear to be deceptive or misleading.

Years ago I was "wowed" when a system builder showed me 3DMark2000. Not only could I see performance-pretty graphics, but I got a number I could use as a basis for comparing systems. I trusted the results. This is how benchmarking became popular.

To gain the competitive edge, OEMs started tweaking their systems to get better results — installing certain drivers and adjusting video card memory and GPU clock settings, for example.

Now, there's nothing wrong with this. It's akin to tuning your

published by manufacturers will evaporate — if it hasn't already.

At APC, we will continue to wade knee-deep through testing documentation to report whether products perform to the standards their makers claim, and this will mean the end of synthetic benchmarking as we know it.

The only uses for synthetic tests will be to show if a component or system delivers certain features, and for end-users wanting to optimise their systems. No longer will we be able to use these tools as a measurement metric. To draw true comparison between products, more emphasis will be placed on real-world application testing.

Here's an idea: perhaps consumers could do their own testing before buying. At least the fudge factor would be licked.

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# Need to Know Nibbles

## Desktop turns the tables

Graphics giant nVidia is reversing technology norms, with innovation for the PC desktop leading that for workstations. The company's new Quadro FX 3000 and 3000G video cards will feature in Hewlett-Packard's xw600 and xw800 stations.

The cards draw from nVidia's GeForce 5900 FX and, like the GeForce FX line-up, occupy a slot space as well as their AGP connection and require internal power to be supplied directly to the card.

nVidia says its new products feature more than 20 improvements on sub-\$1,000 desktop cards and use a different die. Chief among the additional functions are "framelock" and "genlock" capacities — framelocking allows more than one system to work on graphic output; genlocking allows a video signal to be spread across a number of outputs in a "video wall" effect.

The really interesting figure for system engineers and those contemplating an investment in the technology is the memory bandwidth: 27GB/s a second means that video silicon won't be a bottleneck for the foreseeable future.

The FX 3000's street price is \$2,295 and the 3000G is \$2,995.

## Fiddling with Nero

The popular Nero Burning ROM has moved up to version 6 in style. Many would agree that the likes of Easy CD Creator Platinum beat older Neros hands down in the looks department — but not any more.

A glamorous overhaul in appearance is only the beginning. Nero 6.0 Ultra supports both CD-writing and DVD-mastering, and offers several sub-applications including: InCD4.0, to use your CD or DVD rewritable like a floppy disk; Nero Mix MP3, for music ripping; NeroVision Express 2.0, for video authoring; and BackitUp 2.0. Nero now supports DVD playback and can encode video to MPEG-4 format.

For the company line, visit [www.ahead.de](http://www.ahead.de). For the full story, see the review in next month's APC.

## Catcalls and doggerel

Cat owners who habitually talk to their pets may be thrilled to hear about Meowlingual. Creator Takara says the microphone device stops the chats being so one-way by translating meows into words. In a blow to all those poker-faced felines, it claims the device can even pick up on emotions.

Takara already sells Bowlingual for dogs, which sports wireless collar-mounting. With Meowlingual, the mic must be held up to conversing kitties interview-style.

Continued under gatefold ➤

# Shipping News

## Centrinos gain momentum

The Centrino triumvirate of Pentium M processor, Intel Pro wireless LAN adaptor and i855 chipset has proven itself in the marketplace. As our annual notebook megatest from August showed, Centrino-branded notebooks are offering higher performance than units built using older technologies. The advanced power-saving features are also providing longer battery life, and driving more value into the notebook space.

Toshiba has decided to capitalise on these benefits. Next-generation versions of the Portégé M100 and R100 notebooks (\$4,400 and \$4,620 respectively) will both bear the Centrino logo. The R100 will feature an ultra low-voltage 1GHz processor, and a 1.2GHz version will drive the larger M100 unit. See [www.toshiba.com.au](http://www.toshiba.com.au) for details.



## \*nix

While Red Hat Enterprise Linux remains the exclusive domain of Red Hat's coder circle, Red Hat Linux has returned to external development. Gone is the insularity and in comes the motto "Openness. Participation. Quality. Change. Disagreement. Opportunity. Community". Catchy, eh? The company clearly hopes to rekindle the love affair it once enjoyed with the booming development community.

The new version of Red Hat is in its beta stages (dubbed "Cambridge", codenamed "Severn"), with release planned for next month. Red Hat is encouraging developers to participate in its developer list ([www.redhat.com/mailman/listinfo/rhl-devel-list](http://www.redhat.com/mailman/listinfo/rhl-devel-list)) and input into its roadmap (<http://rhl.redhat.com/participate/roadmap>). The roadmap site includes near-future objectives, and this promising look into the crystal ball: "In general, you will see much more aggressive change to the distribution. Red Hat will incorporate more external contributions of code and documentation."

While the SCO Group seems to be pointing learned fingers in more and more directions, some Australians are taking affirmative action of their own. Open Source Victoria, unimpressed by SCO's warnings to Linux users that they may be liable for copyright violation, took the issue to the Australian Competition and Consumer Tribunal.

It has asked the watchdog to take up the cause of Linux-loving Aussies, mentioning SCO's "unsubstantiated claims and extortionist legal threats for money". OSV urges users to send the ACCC their complaints about SCO's behaviour by visiting [www.accc.gov.au/about/fs-contact.htm](http://www.accc.gov.au/about/fs-contact.htm).



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## lets

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page 73). Lycoris, like  
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According to Takara, more than 300,000 people have paid about AU\$200 each for Bowlingul. Meowlingul, with lower hardware specs, will be about AU\$150. Quirky extra features such as horoscopes are being promised.

Availability is initially limited to Japan, but with the canine communicator about to go on sale in the US and South Korea, the cat version could soon go international.

Incidentally, there is no news on the long-anticipated USB-mountable probe that delivers 240 volts to Garfield if he falls asleep on your keyboard.



► **Purfect:** go on, just ask your cat how it's feeling.

## Hand-holding in the house

Sony's own processors adorn the company's new Palm OS 5-powered UX series of handhelds. Wireless communication is a key drawcard for the US\$600 UX40 CLIE and US\$700 UX50 CLIE. Both offer Bluetooth, and the UX50 also supports 802.11b. There's no shortage of goodies; starting with a 3-megapixel still/video camera.

The system internals reflect Sony's intention to maximise inhouse production. Sony's ARM926 processor is the foundation for base calculation tasks, with a DSP and graphics accelerator chip to pick up ancillary functions. Sony calls the combination the Handheld Engine.

Support for MPEG-4 recording and playback confirm that the CLIE is well and truly in the mobile multimedia space. Screen size is a generous 480 x 320, the design supporting the clamshell-style flip top as well as "twist and flip" mechanism seen in the current CLIE range.

## Porting a Quake in a NET

Microsoft has had developers quaking for years, but its latest diversion has met with approval from the most sceptical of code monkeys. In an effort to show that living with .NET is a breeze, Redmond is pointing to Vertigo Software's use of Visual C++ .NET 2003 to port id Software's ageing first-person shooter, Quake, to .NET's common runtime language.

It's not the most compelling sales pitch ever mounted, but it's more diverting than forms-generation and XML Web services.

The code can be run as a managed .NET application without incurring too much of a performance hit. From there, adding features is fun, says Vertigo ([www.vertigosoftware.com](http://www.vertigosoftware.com)) — an anti-bugger overrun function, perhaps? The developers included a white paper detailing the

code differences between the native C code base of Quake II and C++.

Vertigo enjoyed the experience: "It's nice to mix native and managed code, to have control over memory management and to use existing libraries as well as .NET framework classes, all in the same application."

To see how a development tool can be used to port an old game to an updated format, head to <http://msdn.microsoft.com/visualc/quake>.

## Wal-Mart doctors SuSE

Giant US-chain Wal-Mart has added SuSE-based systems to its lineup of Linux-based PCs. Wal-Mart representatives state that the store has had a "strong response" to its Linux offerings, and that it will "continue to explore different models." They claim that the introduction of SuSE into their Linux PC lineup allows additional flexibility for customers.

Wal-Mart has already been selling Microtel PC systems packaged with Lycoris and Lindows. Strongly reminiscent of Windows, they rank low in the Linux-complexity stakes. While the SuSE 8.2 distribution is capable of similar novice-friendly output, it's regarded as being much more "core" and sophisticated.

The SuSE systems on sale span both AMD and Intel chip platforms. The range offers options from 1.2GHz Durons through to P4 2.53GHz machines.

## iQue can find you

US-based Garmin International ([www.garmin.com](http://www.garmin.com)) has released a PDA with a difference. Don't groan if this sounds familiar, but the iQue 3600 actually does have a worthwhile addition — a global positioning system (GPS) is built in.

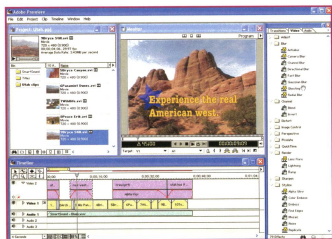
Originally presented at this year's Consumer Electronics Show, the unit has hit American shelves priced at US\$589. Apart from GPS and the support for voice commands, the unit is middle-of-the-road in hardware terms. A 200MHz ARM processor runs Palm OS 5, with 32MB of RAM to play with out of the box.

For locals the big question is, when will the device support countries in the Asia-Pacific region? A CD-ROM only supports map-routing for the US and most of Europe.

For more information, visit [www.garmin.com/products/iQue3600](http://www.garmin.com/products/iQue3600).



► **Killer app or app killer?** GPS PDA, but no local support.



## Encore, Adobe

All's quiet on the Adobe DV front since the release of Adobe Encore DVD back in April. The multimedia company hasn't been resting on its laurels, though. It's been developing a range of DV-related products.

The latest addition is Audition, a rebranded version of Cool Edit Pro, which Adobe acquired mid-year. The sound-editing application joins Premiere Pro and After Effects, which have also been recently upgraded.

Adobe has also released its Video Collection package, including versions of Premiere Pro, After Effects, Audition and Encore DVD. The package has a launch price of \$1,729 with an edition for the education sector for \$729. More information can be found at [www.adobe.com.au](http://www.adobe.com.au).

## Get Creative

Creative ([www.australia.creative.com](http://www.australia.creative.com)) has launched a new range of pocket Flash-based MP3 players. The 51 gram LX series provides support for MP3 and WMA audio files, and adds voice recording and FM radio playback features to the lineup.

Creative claims the Li-ion battery provides up to 10 hours of operation under normal use, but your mileage may vary greatly. Either way, the LX's battery can be charged via the USB cable, so you're not tethered to a power point. It's also detected as a generic mass storage device under Windows, so it can be used as a memory key.

The unit doesn't support USB 2.0, so you'll have to be prepared to wait while your songs are copied to it.

The 256MB LX 200 retails for \$379 and the 128MB LX 100 for \$279.

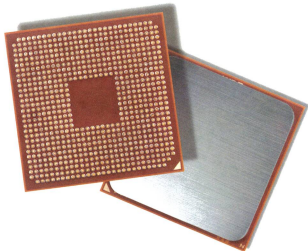


## When I'm 64

AMD's ([www.amd.com](http://www.amd.com)) push towards 64-bit computing doesn't end with the Opteron. AMD is set to release a 64-bit desktop processor, the Athlon 64, in August.

The biggest benefit is its ability to run 32- and 64-bit applications side by side, without the need for emulators or translation layers. This has been achieved by developing an extension to Intel's original x86 architecture to support extra commands and work with 64-bit chunks of data. The new x86-64 platform differs from, and remains incompatible with, Intel's 64-bit instruction set found in the server space, dubbed IA-64.

AMD says the Athlon 64 will usher in a new generation of computing and ease the transition to 64-bit applications. Pricing isn't available yet, but expect a detailed review in *APC* soon.



## Tastier tabs

Lycoris ([www.lycoris.com](http://www.lycoris.com)) is beset by an inexpensive distro that scored a Linux distro shootout (*APC* April), several other emerging Linux distros, and tech-savvy buyers who don't need the bloated of Microsoft operating systems.

Now the Redmond-based company is foray into the tablet space. Desktop represents a sizeable leap forward and helps further drive the Lycoris side. All the standard tablet features, onscreen virtual keyboards to point and click.

Lycoris even offers a certification program for manufacturers so builders can speak with retail units and shave about 10% off the whole tablet.



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## Inklings of a rip-off

**Printer-makers say that using anyone's ink but theirs is like getting a transfusion with the wrong blood type. Maybe it's time to seek a second opinion.**

**C**onsumer groups and online communities are putting the blowtorch to printer-makers over perceptions that smartchips in printers are just scams to get you to buy more ink. More "genuine" ink, that is — code for ink made by the printer-maker.

Two smartchips are at the centre of allegations. One locks your printer because the ink waste pads are allegedly full. The other is supposed to measure the cartridge ink level. But consumers have found that the smartchips are little more than smart sales tools.

The non-profit online Computer Support Network (CSN) has had a stream of complaints about Epson printer software producing a dialog box about a locked printer and an instruction to go to a service centre. It happens when the printer has done a few print-head cleaning cycles. A small pad collects residual ink spilled during the process and a chip supposedly measures the ink on the pad. As it turns out, it's just an algorithm counting cleaning cycles.

"It doesn't detect how much ink is on the pads because we've changed the pads and the printer is still locked until the counter is reset," said CSN's Matt Campbell. "All they do at the service centre is reset the counter, so why aren't people referred to the help desk?"

At Epson Australia, Mike Pleasants confirmed this was the case and said it happened because of bad inks — vendor-speak for those made by someone else. "The ink upsets the nozzles, not the printer, and 99.9% of people won't be affected by this algorithm if they use genuine inks. We encourage genuine inks because printing is a marriage between printer, ink and paper. If someone is getting upset because the ink has blocked a nozzle and makes the

charge that "empty" ink cartridges weren't even close to empty. Rather, the association — educated perhaps, but not with honours — toed the Epson line that residual ink was necessary to run a printer properly.

Chucking out half-full cartridges is good for business, of course. Analyst IDC reported that first-quarter inkjet printer shipments were down 15% on Q1 2002. In Q1 this year, the ink cartridge market ballooned nearly 10%. Break out the Dom Perignon (which is more than seven times cheaper than HP colour ink per millilitre, according to the UK Consumer Association).

APC reader Stephen Cole-Stokes has suggested a bold new purchasing scheme. Last Christmas he bought an HP656C deskjet at Dick Smith for \$98. It included one colour and one black cartridge. Later he went to Tandy, where the black cartridge was \$64.90 and the colour \$71.90. That's \$136.80. Next time, he said, he will save himself \$38.80 by buying another printer, throwing it away and keeping the cartridges.

The UK Office of Fair Trading has recommended a benchmark be developed to measure ink cartridges so the real costs of printing can be publicised. The Australian Consumers' Association liked the idea but said it wouldn't be easy. "The key issue is disclosure on how the product behaves compared to how it's sold," said ACA spokesperson Charles Britton. "But I suspect there are technical challenges that vary from manufacturer to manufacturer."

The UK organisation advises users to keep away from brand-name cartridges and pick cheaper alternatives. It was a case of buyer beware in both cases, Britton said. Beware the rip-off

## Consumers have found that the smartchips are little more than smart sales tools

printer do another head clean, I say get upset with the ink people."

There is a utility to reset the Epson counter for certain USB models, and if you had a PhD in datamining, you'd find it at <http://ftp.epson.com/drivers/epson10281.exe>. Type "Epson unknown error" at [fixyourownprinter.com](http://fixyourownprinter.com) and you'll not only see thousands of people freaking out about their locked printers, but some commercially available solutions too.

In July, Dutch consumer association Consumentenbond advised its 650,000 members to boycott Epson printers because the chip measuring ink levels was fibbing. When it said the ink was dry, another 50 pages could be printed. UK Consumer Association researchers bypassing the smartchip system found they could print 38% more pages before ink quality started to degrade, but the organisation stopped short of calling for a boycott.

Epson went feral with an advertising blitz and hauled the consumer lobbyists into its office for "education." Consumentenbond called off its boycott but didn't retract the

in buying a brand name, and beware non-genuine inks that give cruddy performance and clog print-heads.

Ink-pad algorithms locking printers could be a reflection of the unbranded ink cartridges, Britton said. "We support competitive markets, but third-party products need to fit seamlessly in a product. If there are limitations, there should be clear statements about how it differs."

The outcry is global and should be enough to push the printer cartels to develop fair dinkum measurements of ink performance. If they don't, then let loose the government regulatory dogs.

Dispatch doesn't doubt there are shonks selling rancid ink that melts print-heads. But manufacturers' smear campaigns against competitors, dressed up as education about the best inks, which happen to be the manufacturers' inks, look suss to say the least.

If this isn't a blatant example of anti-competitive behaviour, then I'm resigning as president of the Richard Alston Fan Club.

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## Border skirmish

One monitor, two different stories, as a disagreement about a display gets edgy.

Dear Watchdog,

I bought an Olympic 17in monitor from GameDude Computers in Brisbane. On hooking it up, my techie and I considered it faulty as it had a black border about 8mm wide along the bottom and 3-4mm wide on either side. It was as if the tube was mounted too high in the casing. Repeated adjustments, hooking it to a second system and changing graphic cards made no difference.

I contacted GameDude and was asked to return the monitor. When I did, the manager told me all Olympic monitors had a "painted border" around the screen and there was nothing wrong

with mine. He said that as I had removed it from the packaging and there was dust on the monitor case, I had voided my warranty and would have to deal directly with the manufacturer. I fail to see how he could have concluded that the monitor was faulty without removing it from the packaging.

I then phoned a friend who had owned a similar, 19in Olympic monitor. He told the manager that his had never had a border. The manager hung up on him and said a 19in monitor was different to mine. He even refused to acknowledge that there was a noticeable



border on my monitor.

I handed over \$730 for purchases including the monitor. When I pointed this out, the manager basically told me that there were plenty more customers like me and that I could take my money elsewhere in future.

*Brian Astbury  
Brisbane, Qld*

GameDude Computers sales manager Kathleen McGovern told Watchdog that Astbury had unrealistic demands about a monitor that was

## Quickening the pulse

The Watchdog issue that has generated the most reader interest in recent months is Quicken's \$9 charge to re-register its products.

**Ian Morehouse of Chelsea Heights, Victoria:**  
I have threatened to go to another application if something isn't done about this stupid, illogical charge, which is basically a rip-off.

Greg Ricketts from Melbourne said he thought piracy was a global problem, and since he couldn't think of many reputable software companies with a registration process like Quicken's, he wondered about the intention of the fee. A Quicken spokesperson had told him customer service complaints had drastically dropped since the company started charging.

**Is it any wonder?** Ricketts said. For a \$90-odd product, why would we fork out 10% of the purchase price each time we want to register our product or ask a question? It still takes 10 minutes to get through to a Quicken person on the phone. Bring on the competition, I say.

Grant Walters of Wurtulla, Qld:

As a consequence of this bad experience, I will probably not be recommending this software to friends or work colleagues, who number several hundred. The customer service leaves a lot to be desired. They haven't replied to my last email. Under no circumstances will I accede to paying their \$9.

Peter Hayward of Dulwich, SA:

I too have been frustrated at this development from Quicken. Although the cost of re-registering is small, it is nevertheless a disturbing development for a software company. In the face of open-sourced solutions rapidly gaining acceptance, it's surprising that a software company would move to alienate its previously loyal user base by the introduction of fees of this nature.

Emailer Tony Kisbey said he had asked the company:

Why is it that Quicken/Intuit doesn't tell the purchaser this is how it works — before the purchase is made?

He said Quicken customer service replied:

There is nothing in the license agreement expressly stating there is an additional charge. However, there is nothing forbidding it either.

Tom Sadler emailed to say it was

a shame such a good product has been ruined by a petty, money-grabbing exercise. He was happy with the product, but this new development has lost Quicken a loyal customer.

Quicken did not reply to Watchdog's enquiry about the latest correspondence.

## Contact us

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not faulty. He was given the contact details of the distributor and authorised repairer, who he visited. "The distributor confirmed that there was no fault with the monitor."

The events as outlined by Astbury were not correct, McGovern said. "After the customer was informed the monitor was not faulty, and therefore no free replacement was available, he began to get agitated," McGovern commented, "At one stage I had to ask the customer to refrain from swearing as there were other customers around, and there was no need for swearwords."

McGovern invited Watchdog to contact Olympic's distributor, Z-Tek, to confirm the store's version of events.

At Olympic distributor Z-Tek, a representative, Jamie, said he recalled dealing with Astbury, whose claims about the monitor were "rubbish". "I have BenQs, Samsungs and Liteons here," he said, "and they all have a similar border."

He confirmed that a monitor with a 15mm black border would be faulty, but said Astbury had exaggerated; his monitor in fact had a 1-2mm border around the top and sides, and 5mm on the bottom.

The matter was eventually resolved between GameDude and Astbury, with Astbury returning the monitor and receiving a refund. GameDude charged a 15% "restocking fee".

### Dear Watchdog,

I bought a Telstra cable modem for less than \$50 off eBay. When I contacted Telstra about getting BigPond cable Internet connected, I was told if I wanted to use a modem that I got from someone else, I had to provide their billing details so that Telstra could check that no money was owing on the modem.

I got these details, and then supplied them. I was then told it was fine for me to use the modem but it wouldn't change the cost of the setup fee. The initial setup fees were as follows:

3-month contract \$400  
12-month contract \$259  
18-month contract \$189

I have been a user of Telstra cable broadband in the past. I first connected to their service in late 2000. At this time I went on a 3-month contract. In 2000 the setup fee was more than it currently is, but the cost of the modem accounted for \$400 dollars of the total cost.

I don't currently know how much of the \$400 for a 3-month contract is for the modem, but I find it highly suspect that if I already have my own modem that is quite capable of being used on the Telstra network, it wouldn't reduce the cost of installation. In my view, this is obviously a way for Telstra to lock users into lengthy contracts with them.

All I'm asking is that Telstra remove the cost of the modem from their installation price.

Ian Jackson  
via email

Setup fees have been commonplace amongst ISPs since the dialup era. With its need to physically connect households to the infrastructure, cable has a more complex installation process than copper-based ADSL.

In the case of Telstra BigPond cable, the company charges a setup fee to cover administration, and work by a technician to physically install cable. Even on properties which are already receiving cable, the technician is required to test the signal strength and record the data speed.

Jackson didn't have an issue with Telstra charging a fee for setup, but did not want to be charged for a cable modem as well. At first glance, his complaint seems to have merit. Watchdog contacted Telstra's Public Affairs spokesperson Kerrina Lawrence about Jackson's issue. She directed Watchdog to Telstra's online rate card for cable broadband, specifically the installation fees section, at: [www.bigpond.com/broadband/access/cable/plans/default.asp#installation](http://www.bigpond.com/broadband/access/cable/plans/default.asp#installation).

On the issue of customers bringing used modems to the service, the rate card was clear:

Customers are entitled to a reduced installation fee of \$189 for a 3-month contract if:  
a) they possess a modem from their previous Telstra BigPond broadband cable service or;

## Panther at a price

Apple will charge \$229 for its next OS X upgrade, called Panther.

Since the OS X's launch last year, there's been the Puma upgrade (free, except for shipping charges if not close to a dealer) and the Jaguar upgrade, which cost \$229.

Panther offers full-motion video chat and file-browsing revisions, including encryption and online file storage. Apple users are noting that competitor Microsoft doesn't charge for incremental upgrades between OSes.



What do you think about charges for incremental OS upgrades? Write to [watchdog@apcmag.com](mailto:watchdog@apcmag.com) or PO Box 4088, Sydney, NSW 1028 (include full contact details).

b) they have otherwise legally procured a Telstra BigPond broadband cable modem in good working order from an ex-BigPond Broadband customer.

Lawrence offered to pursue the issue on Ian Jackson's behalf if he could verify which channel had told him the rate list he originally mentioned applied in his circumstance.

### The 'dawg house — hot issues

- 1 Quicken's \$9 registration charge
- 2 Local hosting costs
- 3 Telstra ISDN v ADSL provision



## Broadband dreaming

As someone unable to get ADSL because of Telstra's narrow-sightedness, ISDN is a positive. But I have to put you straight in one area all computer magazines constantly overlook: Telstra also offers two-way satellite Internet connection. This was started in the middle of 2001 for people living in remote areas of Australia and is now available anywhere in the country.

I was fortunate to be able to receive this service when living remotely, for \$64 a month with a 400Kbit/s speed and hardware for free.

Not worth the time really — I get more out of my Telstra dialup at a limit of 400Mbit/s — so I have \$3,500 of satellite hardware and software sitting in the garage gathering dust until Telstra pulls its finger out and makes life cheaper. At least I have something to show for the taxes I pay, even if it is way beyond my finances to run the stuff.

Unfortunately for me, I have moved into Alice Springs. It is going to cost \$400 to have the dish re-installed and \$120 a month for a speed not much better than dialup. ISDN seems positive but Telstra needs to look at its pricing structure and offer the only alternative at a reasonably reduced rate until it gets its act together.

Telstra dialup will remain with me even if it is only 28.8Kbit/s due to pair gained technology. To me, broadband is an unaffordable dream.

An ISP in central Australia, Switch, will be offering wireless broadband up to 400Kbit/s by Christmas for Alice Springs residents. This looks very promising.

**Michael Wyndham**  
Alice Springs, NT

### AMAZING PALM-ISTRY

I would like to commend the developers of LauncherX and Wassup for their excellent work. I have a Palm Zire, and seeing the Palm Workshop article (APC July, page 142), decided to try out some of the software. I was amazed at the effort that must have been put in.

I am never going back to the standard launcher screen, and am almost prepared to ditch Datebook.

Kudos to APC staff for finding the software too.

**Jack Blakley**  
via email

### TRIAL DVD SUITES FIRST

Your review of DVD-authoring software (APC June, page 76) was very informative. I have used several packages quite extensively over the past year, including more recently Vegas+DVD.

It is probably not possible for you to review software in a complete manner, otherwise you might be warning your readers that DVD-authoring and video-editing software in the "cheaper" price-bracket is likely to have

## Letter of the month

Your OS shootout between Windows and Linux (APC July, page 103) should have included Mac OS. While it is good to see APC giving equal exposure to most areas of the technology market, I think its obsession with Linux is not good.

Linux is seen as the next OS blitz, but it will probably never overtake Microsoft's stronghold because Windows is pre-installed on most PC vendor machines and unless they're tech-savvy, no-one will opt to disagree with the Windows EULA and buy a different OS.

Windows is easy to use, multimedia rich and supported by all hardware vendors. The only thing going for Linux is that it is free and stable for business servers.

But what it comes down to is that even if businesses swap to Linux, the money saved will have to be spent on re-educating staff on how to actually use it.

**Robert Candelori**  
via email

Microsoft isn't going anywhere, but Linux is creeping into the mainstream. Check this month's *Shopping News* (page 32) to see how US chain Wal-Mart has added SuSE to its range of Linux-installed home PCs.

**FOR HIS OPINION, Robert wins a Wireless Optical Desktop from (wait for it) Microsoft. Valued at \$229.95, the keyboard and mouse combination should make couch-bound browsing that much easier.**



some limitations and even bugs.

My experience with Pinnacle Studio 8 has resulted in long hours of frustration. The video-editing software was prone to crashing and would not render properly under certain conditions. The tech rep I spoke to was helpful but unable to deliver a stable revision, so I gave up and insisted on returning the product. Pineapplehead was kind enough to oblige with a refund through the retailer. The tech rep made the comment, "You have to remember it is only a \$250 software package."



This is an "always on" service, as every bit of data is sent up and down via satellite; no need for phone lines.

The whole program was an election promise from the federal government for people living in remote communities or on cattle stations. They nearly all had telephone only via a radio network. As a result you could get a max of only 7,200bit/s (if lucky).

So what did we get? \$3,500 of satellite hardware and software and installation for free. We had a choice of three plans: \$20 a month at 33.6Kbit/s, \$44 a month at 64Kbit/s and \$64 a month at 400Kbit/s, all with unlimited downloads. After 18 months it reverted to Telstra's commercial rate, which starts at \$120 a month with a 300MB limit.

Hence it was with great expectations that I tried Vegas+DVD after your positive review. Yes, it is good, and for the premium price over Studio 8, it should be. It is intuitive, fast and stable.

Everything worked as expected except when I came to watch the completed video on a home DVD player. The menus did not highlight when selected, so it was impossible to make a menu selection. When I tried it on another DVD player, it worked fine. The Internet forum site for Vegas+DVD revealed this as a common problem. It seems that older home DVD players read the menus, but some newer models don't.

Sonic Foundry acknowledged the problem, but its response puzzled me: "Unfortunately I do not have a specific release date for a DVD Architect update, and I can't even guarantee that the issues you're having are going to be addressed in the next update. We are aware of the issues, and they will be fixed as soon as possible. Typically, we release an update approximately every two to three months."

In my view, a DVD authoring package creating non-functioning menus is a problem of fundamental proportions, and I would have thought Sonic Foundry would give it top priority. Any bug so easily reproduced must be easy to fix.

The message to buyers is that software in this rapidly developing field still has a long way to go in delivering predictable results. Get a trial version and give it a thorough hiding on some large projects before committing to a purchase.

**Grant Giffillan**  
Castle Hill, NSW

#### PITCHING LINUX

Even though I am retired, I do enjoy a challenge, so I decided to learn Linux. I started by buying

a \$40 book on Red Hat Linux, which came with CDs containing version 8.0. To date, I have managed to load it onto two computers: a desktop system with Athlon K6 2/500 CPU and a laptop Pentium with a 150MHz CPU.

The surprising thing about this (graphical, not text) installation is that it works reasonably well, although it may be a little slow for some. In both cases I configured the network protocols and Internet connection in about 10 minutes. I was pumped at what I was able to achieve with this new-to-me package in such a short time.

Once I had installed Red Hat, the surprises started to come in a big way. The package included not only the OS, but also an office suite, graphic tools, Pilot/Handspring tools, plus much more that would cost a small fortune if business, the SOHO user or the PC hobbyist had to buy the commercial equivalent. I am starting to learn some of the more challenging features.

However, I am a little disappointed with the coverage given to Linux in most journals and magazines — one page, maybe two — with the assumption that those who read the articles are intermediate or advanced users. There is absolutely no consideration or encouragement given to the new user.

I would like to suggest a new section for your magazine — call it New to Linux or Linux for Beginners. A little help with the fundamentals could see a better-than-expected surge in the take-up. Maybe some of the Linux people, its local distributors and supporters might like to contribute. After all, variety is the spice of life.

In business, employing familiar with the workings of more than one platform could be a bonus.

**Ron Lardner**  
Oberon, NSW

#### SOHO OR NO?

I am lucky to live in a new suburb in a large city. However, I can't get ADSL or better because someone took a shortcut down the end of the street with the communications technology. I don't think I'm unique in having this impediment, or in the number of PCs at home (four).

The cost in time and money in keeping

## Agenda: your place to vent

Why are Australian hosting companies 100%, 200%, 300% more expensive than overseas hosting companies? I am hosted by an Australian company with an office in Queensland, but I know for a fact that the hosting of the actual pages is done overseas — so why pay the Australian price?

From my research, the same 500MB storage account costs about \$88 a month locally and \$10.50 a month overseas. Why the big difference?

**Bernie Zuecker**  
Geelong, Vic

## Prize Pit

The lucky winner of our July subscriptions competition is R J Steel of Bentleigh, Vic, who has won a Fujitsu Stylistic ST4110 Tablet PC, valued at \$4,399.



all of the systems up to date, the odd bit of troubleshooting and the "Oh, I@#?" experiences when something dies is substantial. If I spent more, I could upgrade the PCs to a small-business network with a server and remote administration, licensed virus software, etc. The question is, is the time and expense worth it? How much effort is required and would it benefit the household budget? Do we really need to install a version of Windows Server, use XP Pro on every PC, learn how to use distributed software licenses, learn how to automate updates and backups, etc?

**Mark Matheson**  
via email

## Have your say

We welcome your comments and suggestions. Send email to [epinions@apcmag.com](mailto:epinions@apcmag.com) or write to **Epinions, APC Magazine, PO Box 4088, Sydney NSW 1028**. All correspondence — which must include the writer's full name and postal address — becomes the property of APC and is subject to editing.

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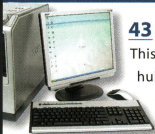
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# On Test

Detailed product reviews and comparisons



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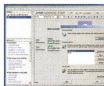
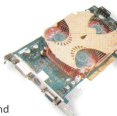
This powerline network solution is a bit of a shocker.

### 64 Hyundai ImageQuest Q17

Hyundai's 17in TFT has excellent picture clarity, but it's not as sleek as might be expected.

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# Watch this space



► **One for all:** the multifunction big-screen PC dream lives on.

**A big-screen home entertainment hub has appeared over the technological horizon, but it's not all smooth sailing.**

Attempts to stretch PC versatility to a home entertainment centre dates back to at least 1995 and IPC's disastrous MY.G.NIE. But the dream of a big-screen PC that also serves stereo, video and the like has never died, and it's now thriving enough to support three categories of hardware. Enthusiasts are designing DIY systems based on barebones mini-PC systems; vendors are creating PCs that do double-duty in the living room; and Microsoft is spruiking Media Center systems built around a bespoke version of Windows XP and with massive CRT monitors and 5.1 sound systems.

Acer's Aspire RC series sits neatly in the middle category with two identically specced and priced lines, the slim-tower RC500 and full-tower RC900, starting at \$2,499. For this review, we tested the mid-range \$2,999 RC902.

At first glance there's no mistaking the RC902 for anything but a PC. However, the brushed-metal chassis, 15in LCD monitor, modular speakers and wireless keyboard/mouse combo raise hopes that it's more than a dressed-up word processor. Then the multifunction control for remote operation positioned on top of the tower gives the game away.

## LET ME ENTERTAIN YOU

The Aspire RC series has several entertainment modes — watching TV or video, scrolling through digital photographs, playing CDs and listening to FM radio — in addition to running Windows XP.

Selecting and switching between these modes involves quite a bit of to-and-fro on behalf of the machine. The PC boots into Windows as usual, but choosing any of the entertainment modes forces Windows into hibernation, then flashes a curious Resuming Windows message before it launches an Acer-designed GUI for the relevant function. This process can take up to 30 seconds.

You can switch between non-PC modes using a Super Dial on the case, or by jabbing at the remote control or keyboard hotkeys, just as you might on a conventional home hi-fi system, and each shift takes several seconds. However, CDs can be played without going through the entire power-up process. Moving back to Windows requires another wait as the system shells out of the entertainment modes and reloads the Windows session.

TV signals are piped through a WinFast TV 2000XP card and managed by CyberLink Power Director Pro software, which enables live and time-shifted digital recording. If you plan to throw away your VCR, skip the entry-level systems with their 40GB hard drive and head straight to the spacious 120GB platters of the top-line RC503 or RC903.

Drive performance on our test system was quite good, returning a SiSoftware Sandra drive index of 27,826, a sustained read-speed of 41MB/s and an access time of just 8ms.



The RC902 is exceptionally quiet, a trait especially appreciated when listening to CDs or radio stations full of softer passages, such as classical music.

Powering all of this multimedia goodness is a 2.4GHz Springdale-class Pentium 4 with Hyper-Threading and an 800MHz frontside bus, backed by 512MB of DDR333 SDRAM. The standard optical drive is a Ricoh DVD+RW, but on the base model RC901 it's pared back to a DVD/CD-RW combo drive.

The optical drive sports a slick sliding black cover. Below the two 5.25in drive bays is another slide-down panel concealing the floppy drive, a pair of USB 2.0 ports and a four-pin FireWire port (two more USB 2.0 ports and a conventional six-pin FireWire port are on the rear). The front panel also has a card reader which supports Memory Stick, Secure Digital, CompactFlash and SmartMedia cards.

The sound system starts with onboard Realtek AC '97 Audio and bundled 2.1 channel speakers. Both front and back panels host ports for a microphone and headphones, plus coaxial and optical SPDIF audio-out for connection to a hi-fi system.

The mainly solid system's Achilles heel is its graphics card. Acer would have done well to replace the 128MB Radeon 9200 with a meatier Radeon 9700 or higher.

Overall, the Aspire RC900 achieves its aim of blending a variety of entertainment roles into a PC system, although gamers will undoubtedly head back to their desktop machine because of the lacklustre graphics card.

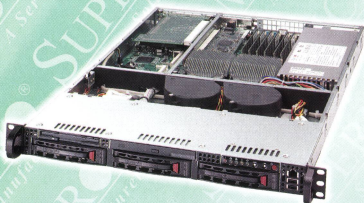
**Paul Robinson**

## Details

Contact	Acer Australia
Phone	1300 366 567
Online	www.acer.com.au
Price	\$2,999
✓ Overall performance; entertainment integration.	
✗ Low-spec graphics card.	
Verdict	●●●○○

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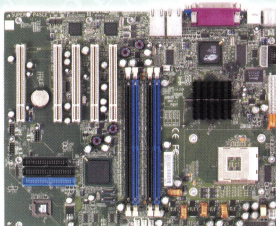
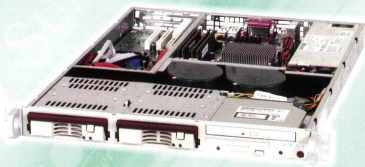


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► Write on: the 12in screen and Pentium M processor make this Tablet PC a standout.

## Slated for success

If you're sick of lugging a laptop, swallow this tablet — the best slate device APC has ever seen.

Motion Computing may be a relatively new player in the PC scene, but it's a brand with a pedigree. A posse of former executives from Apple, Compaq and Dell established the start-up company with the express purpose of riding the Tablet PC wave.

Motion's M1300 is the first Centrino-powered tablet we've tested, and Intel's wireless mobile platform proves to be a perfect fit with go-anywhere tablet technology. Tablets debuted in the pre-Banias era, so they were mostly saddled with the Pentium III-M — a chip that was battery-friendly but faced an uphill battle against the processing demands of handwriting recognition.

Shifting up to a Pentium M processor adds substantially to the system's responsiveness, making this tablet trial nipper than previous ones. Battery life is a little over three hours with solid use, so more than four hours can be expected with typical sporadic use.

The other benefit of the Centrino badge is, of course, integrated Wi-Fi. But there's a limit to how well you can use the Internet with only a pen and touchscreen. Point-and-tap navigation through the Web feels totally natural, although entering URLs and filling out forms online requires a quick detour to the onscreen keyboard.

Handwriting recognition is surprisingly good out of the box and gets better with time. But even 90% accuracy has you correcting every tenth letter or word, and that's enough to make a Buddhist monk go bananas. If penmanship isn't your strong point, consider one of the

"convertible" tablets from Acer or Toshiba.

As a concession to convention, Motion bundles a keyboard with built-in touchpad which plugs into one of the tablet's two USB ports. The spare port (or the single PC Card slot) would probably be used to connect an external CD drive, which is an optional extra.

The USB ports, a mini FireWire port, VGA output, mic in/audio out sockets and modem/networking jacks are all ranged along the bottom of the M1300 — or the side, if you use it in portrait mode. Flipping on-the-fly is easily achieved with a button that rotates the screen through 90-degree increments.

Screen size is another unique attribute. The 12.1in XGA panel is the largest of any tablet, and is sharp on the graphics and responsive to taps.

Like all slate devices, and convertibles in slate mode, holding the tablet so you can write on it creates a barrage of reflections from ambient and direct overhead light.

### HOT TO TROT

The M1300's rear panel warmed after just a few hours' use — not the most ergonomic of traits for a device that spend much of its time in its user's arms. We found the quick fix is to clamp the snap-on plastic screen cover to the back panel. It's perhaps the best use for this otherwise awkward cover.

Another disappointment with this product is the cheap plastic stylus, which feels more like the mandatory spare for when you lose the original.

The test unit was configured with a 1GHz Pentium M processor, 40GB hard drive and 256MB of RAM. The onboard graphics adaptor of the Centrino i855GM chipset shares up to 48MB of system memory, leaving little change from 256MB if you want to run anything more than typical office applications. Even running a few simultaneously (Outlook plus Word or Excel) results in swapping to the hard drive.

On its own, the M1300 weighs 1.3kg; add the keyboard and AC adaptor, and travelling weight is still only 2.2kg. When not on the road, a supplied docking station allows the M1300 to sit in either orientation on the desktop and replicates the tablet's connection ports. However, the stand is so deep that by the time we allowed for cables to snake out from behind, there was no room for the keyboard to sit in front.

Furthermore, the clamp holding the M1300 on the easel could provide a firmer lock and more solid grip.

The tablet PC concept isn't for everyone, and the many limitations of the form will probably never see it reach a double-digits share of the mobile computing market.

And pure slate devices will remain a still smaller slice of that pie.

But for what it is, the M1300 is clearly the best offering to date.

David Flynn and Jarrod Spiga

Details	
PCMark (CPU)	3:12 / 3:00
BatteryMark (hours:mins)	3:10
Contact	GSoft Computers
Phone	(08) 8284 0922
Online	www.gsoft.biz
Price	\$4,198 (as tested)
✓	Design, screen size, battery life.
✗	Rear-panel warmth; no optical drive.
Verdict	●●●●○





► **Crowd-pleaser:** the Mega PC looks the part, even if it requires more polish.

## Room to move

This small form factor computer blurs the line between work and play, but it needs a little more work.

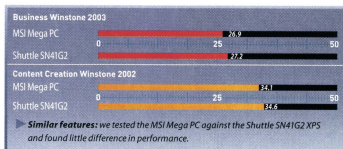
If 2003, in PC terms, is to be remembered for anything it will be as the year the computer moved into the lounge room. Shuttle's XPC range has led the charge, but MSI's take on the barebones theme is a small form factor multimedia powerhouse. It operates as a PC, a standalone CD/DVD player, a radio or a television tuner, and you can fit your own RAM, CPU, optical drive and hard disk to keep the price in check.

The Mega PC is built on the SIS 651 chipset, providing support for non-Hyper-Threaded Pentium 4 CPUs running on the 533MHz FSB. These CPUs ramp up to clock speeds of 2.8GHz, making the Mega PC appear a little dated next to the i865-based small form factor units. Performance is comparable to that of i845PE-based machines.

We tested the Mega PC against the Shuttle SN41G2 XPC — which relies on the i845PE chipset — and found little difference in performance. This was backed up under testing, with the two units' benchmark scores almost identical across the board.

The i865-based machines leave those other platforms for dead, but the main appeal lies in flexibility, not record-setting benchmark figures. The unit manages 26.9 under Business Winstone 2003 and 34.1 under Content Creation Winstone 2002. The Shuttle unit scores 27.2 and 34.6 respectively.

The Mega PC features a wide range of ports, including two FireWire connectors, a pair of USB 2.0 sockets, and a six-in-one media bay to handle flash media.



### MODERATE COOL

One of the biggest considerations when designing a small form factor PC is how to get rid of heat. MSI opt for the Pentium 4 partly because of its moderate cooling requirements compared to AMD's processors.

The Mega PC employs an add-on heatsink arrangement that effectively works to cool the CPU, but the heat it draws away is deposited inside the case. Shuttle's integrated cooling engine does better with pipes, wicking the heat from the CPU to a radiator at the rear of the machine.

One complaint with small form factor PCs that may influence buying decisions is the lack of space under the bonnet. Larger hands will have problems fitting the CPU and heatsink, and the hard disk sits upside down in the case, which can lead to premature drive failures.

The SIS chipset places a limitation on the system because the 100/133MHz FSB can't be adjusted in finite increments for overclocking. But this won't be a problem for most users. Two DDR333 RAM slots enable the PC to address up to 2GB of system memory — which is ample for most.

The motherboard sports dual Ultra ATA133 controllers, meaning you can, theoretically, connect up to four drives inside the unit. In practice, there's inadequate space and you'll stand a good chance of overloading the 200W power supply if you try. We were able to connect an optical drive and two hard disks without any problems.

### EITHER/OR

MSI's approach, while producing a capable PC and a reasonable stereo component, still needs refinement. The system operates as either an entertainment hub or PC, but not both at once. As soon as you hit the power button on the PC, you lose the ability to play CDs.

You could use a software CD player to play music under Windows, but it would still be a benefit if the unit could play CDs and DVDs independently of the OS while booted into Windows.

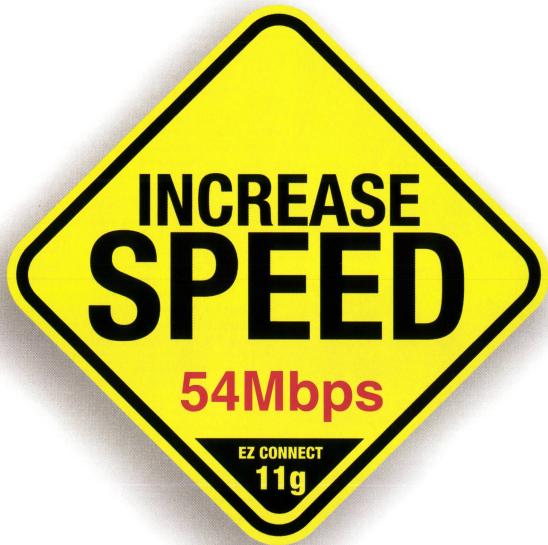
Another minor negative is that the LCD panel remains unused during normal PC operation. MSI could have enabled it to display system temperatures and fan speeds, or monitor performance.

So, if you're in the market for a small form factor PC and want it in the lounge room, the Mega PC is the best one out there at the moment.

That said, it's not as well integrated as HiGrade's Xperian (reviewed in APC July, page 42). We've seen some slick examples of what can be done in a small space, however in this case, the Mega PC will want to improve

**Matt Overington**

Details	
Contact	MSI
Phone	(02) 9748 0070
Online	www.msicomputer.com.au
Price	\$699
✓	Relatively inexpensive.
✗	Design issues.
Verdict	●●●○



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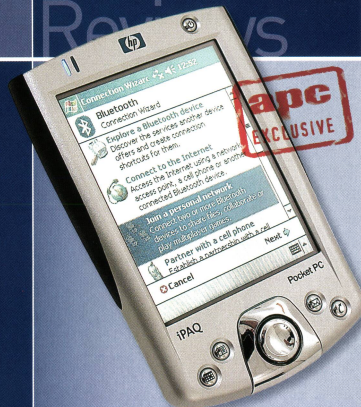
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► **Card sharp:** features in the h2210 include dual CF and SD card slots, and point-and-click Bluetooth.

## H2210

The all-new h2210 is HP's most interesting model. Instead of requiring a bulky expansion pack, it's the first iPAQ with slots for both CompactFlash II and SecureDigital IO card formats.

While most Pocket PCs make do with a single SD slot, add-ons such as GPS navigation devices, networking cards, and GSM/GPRS add-ons are available only in the CF form.

The h2210 uses the same 400MHz XScale PXA255 processor as the top-line h5550 units, and onboard memory consists of 64MB of RAM (57.1MB user-accessible), but only a miserly 3.84MB file store area in non-volatile Flash ROM (down from the h3970's 22MB).

With all buttons gone from the sides, rubber panels on either side of the h2210 (similar to Dell's Axim) increase comfort and grip. Replacing the previous metal casing with plastic also cuts weight to 144g, some 50g lighter than the Toshiba e750 or Dell Axim X5.

The hardware buttons give good tactile feedback, but sit a little too far into the case, demanding extra pressure. The four-way direction pad (d-pad) was also more sensitive than we'd like, frequently registering unintended presses.

The h2210's display edges out the h5550 but can't match the h1940's screen for colour saturation and clarity. Omission of the dedicated voice-recorder button may also deter users reliant on dictation.

However, a dedicated MediaQ graphics processor and a powerful speaker on the unit's rear panel make this a strong gaming device if you can live with the overly-sensitive d-pad.

## H1940/H1930

The small and stylish iPAQ 1910 was one of the first Pocket PCs to challenge Palm on the portability front. The h1940 keeps the 1910's paw-friendly profile but offers built-in Bluetooth, and a standard SDIO slot for peripherals such as digital cameras and Wi-Fi cards.

A speedy 266MHz Samsung S3C2410 processor (the first iPAQ with a non-Intel CPU) serves more grunt than the 1910's 200MHz XScale chip, scoring 71% higher in CPU tests and 58% more in graphics tests under VO Benchmark. But while pixels reach the screen faster, they're let down by a screen that displays white as a ghostly faded yellow.

On tap is 56MB of the total 64MB, with 13MB flash-based file store.

If \$599 for the h1940 is a stretch, the h1930 foregoes Bluetooth and the file store memory, and opts for a 203MHz Samsung CPU, at \$499.

## H5550

Visibly identical to the h5450, HP's new corporate heavyweight's key changes are under the hood. RAM is up to 128MB, with 126.6MB available. Add a 174MB file store and there's 144MB on hand.

A CPU overhaul from the h5450's PXA250 to the PXA255 retains a 400MHz clock speed, but doubles the internal system bus to 200MHz. Benchmarking reveals little difference between the models in the CPU tests, although graphics performance increased by 60%.

However, HP has dropped the h5450's consumer infra-red and remote control software.

**Jenneth Orantia**

# Carry on handhelding

**Four additions to the iPAQ range, including the first in a new model line, sustain HP as king of the Pocket PC hill.**

The first iPAQ Pocket PC, released in April 2000, was a breakthrough for palm-size computing. With its sleek curves, rich colour screen and generous memory, Compaq had produced the virtual archetype for the Windows-powered handheld.

Three years on and the iPAQ range — now badged HP — remain the top-selling Pocket PCs. And judging by the look of its four latest additions, this is unlikely to change.

The new releases run Microsoft's Windows Mobile 2003 operating system, bringing to the platform an improved networking connection, a zipper Web browser, version 9.0 of the handheld Windows Media Player, and an assortment of usage and speed tweaks.

The new iPAQs include the base h1940 and h5550, which are enhanced versions of existing offerings. The h2210 is the start of a mid-range line aimed at penny-wise power users. All three have integrated Bluetooth and a wizard-driven Bluetooth Manager that simplify connections to other BT-equipped devices. The fourth model, the h1930, ditches Bluetooth and a few other features for a lower price.

Despite criticism that the Pocket PC 2002 can't tap into the full power of Intel's XScale CPUs, Microsoft has opted not to tune Windows Mobile 2003 specifically for XScale chips. The OS is tweaked for the broader family of ARM-based processors, leaving developers to optimise applications for different flavours of silicon.

Details >>>	
Contact	HP
Phone	1300 305 018
Online	www.hp.com.au
Price	h2210, \$799; h1930, \$499; h1940, \$599; h5550, \$1,299
✓	Dual DCF/SDIO slots; fast processor.
✗	Overly sensitive d-pad; no record button.
Verdict	●●●●○

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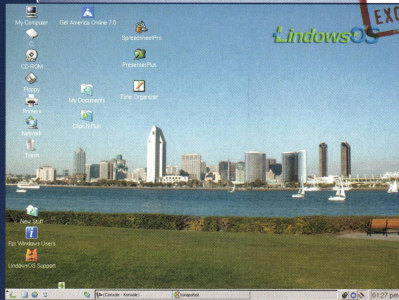
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**MOBILE  
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► **Linux look-alike:** Lindows keeps Windows users in the comfort zone.

## Fast 4ward

**Maybe it doesn't deserve the full-digit advance from version 3.0, but Lindows 4.0 is a superb distro for the mainstream.**

Lindows 4.0 gives Bill Gates another reason to jab a pin into his Michael Robertson voodoo doll. The Lindows CEO is one of the most flamboyant characters in the campaign for desktop Linux. He personally bankrolled the US\$200,000 contest to get Linux running on Xbox. He's responsible for the canny move to have Lindows mimic the Windows interface (criticised by many Linux diehards, but copied by other distros). And, of course, there's the cheeky name for his own open source OS.

Lindows, one of the new breed of distros that's sold and not freely distributed, powers many low-price desktops and notebooks sold through mainstream US vendors such as Wal-Mart. Another difference is that instead of giving the user ultimate power over system setup and configuration, it has only a minimal set of installation options. For example, after booting from the Lindows 4.0 setup disk, you're asked to select from two installation methods: formatting the entire hard disk and loading the Lindows OS; or what's simply labelled Advanced Installation.

The latter doesn't enable you to repartition the disk, settling instead for listing available partitions you can install to. If you're a capable Windows user looking to dual-boot, you'd be better off creating a spare partition to use for Lindows before starting the install.

While this is definitely an easy option, the installers for modern

distros such as Mandrake 9.1 or Red Hat 9.0 leave Lindows far dead. That said, installation is extremely quick, and each of our test machines was running in less than 10 minutes.

### DRIVER REVIVER

One of the best enhancements from version 3.0 to 4.0 is the robust driver support. We're impressed that Lindows detects all the hardware on the test systems — including a notebook fitted with a Radeon-based video card and AC97 audio. USB mice and keyboards, wireless network cards, memory keys and FireWire hard disks were all greeted with open source arms.

Lindows loads quickly on modern machines, and even boots in under 10 seconds on a low-spec Pentium II desktop.

The first time the OS loads, an interactive Flash demo guides you through the friendly Windows-like menu system and icons. That's where many people are quick to slam Lindows, but the fact remains that most users are accustomed to working with Microsoft's system of metaphors. Seeing familiar elements such as My Documents, My Computer and Network Connections makes Windows users instantly feel at home, helping them get into Lindows faster than more individualistic distros.

### WHERE'S THE WARES?

Version 4 contains solid Linux packages, including KDE 3, XMM5 1.2.7 and version 2.4 of the kernel, along with support for Flash and a few basic games. But on the whole, it's relatively light on features and doesn't suffer the package bloat of many more established distros.

Lindows certainly isn't the power users' distro; there are few development tools and advanced functions. But, because it's built on Debian (Xandros built on Debian, to be exact), experienced Linux gurus can simply run the apt-get utility to suck down extra packages.

Lindows buyers can also subscribe to a Click-N-Run service to download and install packages via a Web interface. The only negative is that much of this software can be found on the Internet for free.

But again, it comes down to canny marketing. Lindows isn't sold to the sort of people who are accomplished at hunting down packages, taking care of dependencies, and then extracting tarballs and running installation scripts.

It's to be expected then that users have to pay a little for the convenience of being able to click on an icon to have package installation taken care of automatically.

Another minor point that might irritate power users is the lack of bundled source code. But before open source zealots jump up and down about terms of the GPL, Lindows has made this code available for free download on its site and will even mail it to.

There aren't enough new features in this release of Lindows to thoroughly justify the full-digit bump-up, but the streamlined installer, updated packages and enhanced driver support still make it worthwhile.

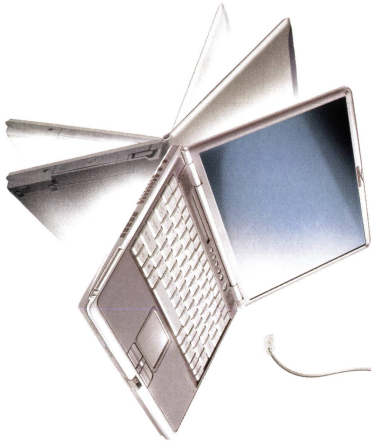
**Matt Overington**

Details	
Contact	Lindows
Online	www.lindows.com
Price	US\$59.95
✓	Massive driver support.
✗	Oversimplified installation.
Verdict	●●●●○

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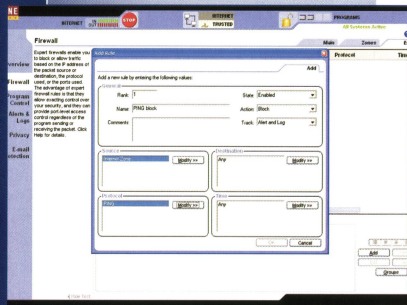
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FJT0080\_P2



MOBILE  
TECHNOLOGY



► **Rule away:** new controls make customising the firewall a breeze.

blue-screening compatibility issues with certain video drivers.

There are now three versions of the program rather than two. ZoneAlarm Plus has more features than the free version, with Hacker ID, MailSafe and advisor services, and is about \$15 cheaper than the Pro version.

#### UNFRIENDLY FIRE

An aspect of ZoneAlarm that draws both praise and criticism is the configuration of the firewall rules. When a new application accesses the local network or Internet, or requests hosting (server) rights, ZoneAlarm halts the attempt and prompts for a ruling before allowing or denying it.

It's a great feature for those who don't want to set up access rights for every single application and protocol manually, but it comes with a worrying lack of information.

Some requests however are self-explanatory. If you want to ping an address, then PING will need outgoing access. But if SVCHOST.EXE wants server rights (it will), what then? Deny the request and your network browsing capabilities could be shot; accept it, and you won't notice anything amiss until it's too late. Zone Labs provides clear info on types of hacks and intrusion alerts you are likely to encounter, and this would be enhanced considerably by including material on internal application requests — what's safe and what isn't, and how your networking capabilities will be affected.

Also, ZoneAlarm won't protect you from viruses. MailSafe will to a degree, but you'll still need a full virus scanner.

## No cause for alarm

**Security issues notwithstanding, ZoneAlarm Pro 4 still offers very good firewall protection.**

ZoneAlarm Pro 4 is a significant version upgrade from Zone Labs and not just an optically branded point release. All the features that formed the backbone of the previous versions carry over — the privacy manager, pop-up/ad blocking, cookie control and local application control. Advisor services and hacker ID (reverse DNS lookup for tracing hackers back to their source ISP) are also included at purchase and can be renewed through subscription.

As well as the standard features, three new ones give this latest release a more comprehensive, robust feel: Advanced Mailsafe, Cache Cleaner and firewall controls.

Advanced Mailsafe monitors incoming and outgoing email, quarantining any messages with one of the 47 attachments associated with email worms and trojans it checks for, preventing both infection and propagation. ZoneAlarm Pro 3 scanned only incoming mail.

Cache Cleaner removes evidence of Internet activity — temp files, search/URL history, browser/page cache and cookies — and acts as a basic system optimiser.

Firewall controls are for advanced configuration of the ZoneAlarm firewall, enabling you to add rules to block or allow specific port and protocol traffic. This plugs-in nicely to the Alert Log, which keeps a detailed record of all allowed or blocked traffic — protocol, type, source, destination for instance — and this information makes it much easier for tailoring customised firewall rules.

Regarding stability, Zone Labs has resolved ZoneAlarm's

#### 4 ON THE FLAW

ZoneAlarm 4 has attracted its share of controversy. A potential security flaw was found in the free version whereby a hacker could — by masquerading as the browser — use the Windows shell32.dll file to send and receive information through the firewall. This is a well-documented Windows flaw rather than a ZoneAlarm problem, with Zone Labs not only saying so but claiming it therefore considered it unnecessary to patch the free version. The Pro version protects against the flaw.

Denial of a security patch infuriated some users who swore they'd abandon ZoneAlarm. They accused the company of trying to force purchases of the Pro version for full protection. Zone Labs' image has certainly been tarnished by the incident, but it's less well-known that it has agreed to patch the free version with a security update differentiating between Internet requests made by the browser and by third-party applications loading through the browser, giving the free version the same level of protection as ZoneAlarm Pro. Visit [www.spywareinfo.com/articles/zonealabs/exploit\\_hoax.php](http://www.spywareinfo.com/articles/zonealabs/exploit_hoax.php).

Despite this kerfuffle, ZoneAlarm offers the most full-featured firewall protection around. The free version meets basic protection needs, and the Plus and Pro versions have more advanced features for those wanting to get serious with Internet security.

The potential for new users to expose their systems is still a worry, however, and should be addressed.

**James Bannan**

Details	
Contact	Zone Labs Inc
Online	<a href="http://www.zonealabs.com">www.zonealabs.com</a>
Price	\$77 (1-year single-user licence)
✓	Handles all aspects of network security, easy administration.
✗	Easy to accidentally expose a network.
Verdict	●●●○

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## Expanded all-rounder



**Canon's latest multifunction device adds new features to an already solid product line.**

Not without reason, the imageCLASS MP730 has a slightly bigger chassis and price than most of its all-in-one siblings.

Despite the growth of email, faxing remains a necessity for most businesses as well as being popular in most homes. The MP730 therefore adds a fax engine. Multiple page faxes can be stacked and sent with the help of the 30-page document feeder.

Also, the CompactFlash slot built into the unit is now accompanied by a second multifunction slot that accepts Sony Memory Sticks, SmartMedia wafers, Secure Digital and MultiMediaCard formats. The idea remains the same — to allow users to feed in a card fresh from a digital photography session.

In look and feel, the rest of the MP730 is largely the same as its cheaper Canon counterparts. Printing is high quality, with four ink tanks instead of the dual cartridges of the earlier multifunction devices (MFDs).

Separate tanks bring costs down because colours can be replaced individually as they run out.

Tests reveal little difference in print speeds compared to the smaller Canon MFDs. Our test prints included a 12-slide PowerPoint presentation and a 12-page text document, which average four minutes and 17 seconds and one minute and 58 seconds respectively in draft mode.

Canon rates the MP730 print engine at 22ppm in mono and 14ppm in colour.

Photo printing is hit and miss. The driver's built-in Vivid Photo filter for enhancing colour works well in most cases, but can occasionally over-saturate.

The printer software is Canon's standard kit, including the appealing Easy-PhotoPrint for borderless prints.

Scanning can be done from the front panel or the host PC. The default, a sensible 75dpi, can be adjusted to its full optical 1,200 x 2,400 resolution through the Canon toolbox software.

A scanned magazine cover fared reasonably, with only a few saturated skin tones.

Colour copying the cover from the console took one minute and seven seconds, and a mono version, taking 17 seconds, was of poor quality.

**David Lin**

Details	▶▶
Contact	Canon Australia
Phone	1800 021 167
Online	www.canon.com.au
Price	\$749
✓	Fax; 30-page document feeder; four ink tanks.
✗	Saturating photo filters.
Verdict	●●●○

## DVico Fusion MPEG-2

## Cold fusion

**DVico's MPEG-2 video encoder has most features a DV editor would need.**

The DVico Fusion MPEG-2 is perhaps the fastest, cheapest and easiest way to convert analog video into a digitised MPEG-2 stream. Plug your VCR or camcorder into the doughnut-shaped box, and then connect that to a USB 2.0 or 1.1 port on your PC, and you'll be a step closer to editing your movie collection and then burning them to CD.

It also compresses TV transmissions into MPEG-2 video if you pipe the signals through the TV tuner in your VCR.

The analogue-to-digital conversion is handled by Conexant's popular CX23416 audio-video encoder. Even though this is a low-cost, low power unit, the CX23416 features built-in noise filters that help maintain image quality. It supports bitrates from 2.0 up to 15Mbit/s at resolutions up to 720 x 576 pixels in both conventional 4:3 and widescreen 16:9 aspect ratios.

Composite and S-Video inputs are provided, and it accepts PAL, NTSC, and HDTV streams. We didn't suffer any problems with audio/video sync

or dropped frames during tests at any resolution. The video quality is acceptable — although not outstanding — and while a few compression artefacts appeared during the conversion process, the image wasn't seriously degraded.

The software interface is easy to use, with individual controls to adjust brightness, contrast, saturation, sharpness and hue. Cropping tools are included to adjust the image, and you can also boost the audio gain if the soundtrack volume is low.

The recording software provides time-shifting features with a full range of VCR controls, such as pause, instant replay, fast-forward and rewind. You can even set mark points and mark out a clip while you're recording it.

The most obvious application for the Fusion is converting a video collection to VideoCD or DVD, but the package doesn't include an integrated authoring application. A copy of Ulead Movie Factory 2 SE is bundled, but it's light on features.

At \$349, the DVico unit is cheaper than many of its competitors, and the output video quality is acceptable. Its only real flaw is that it ships without a CD burning package.

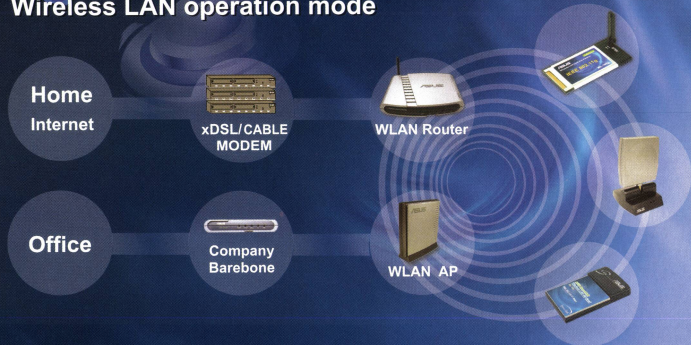
**Matt Overington**



Details	▶▶▶
Contact	Pineapplehead Distribution
Phone	1800 457 601
Online	www.pineapplehead.com.au/distribution
Price	\$349
✓	Inexpensive; video quality.
✗	No CD burning app.
Verdict	●●●○

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## Wireless LAN operation mode



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Wireless LAN Cardbus  
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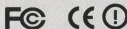
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## The Joy of X

The latest Centrino ThinkPad shows that IBM and Intel make the perfect pairing.

APC has been surprised by the versatility of Intel's Pentium M, which has proven it can take on the Pentium 4-M in mid-range and fleet notebooks, but IBM's ThinkPad X31 is a classic example of what this made-for mobile chip can do. This notebook is small, light, powerful and blessed with abundant battery life.

The 1.6kg unit is built on the same floorplan as the X30, but the engine bay has been refitted with a choice of 1.3GHz or 1.4GHz Pentium M processor — our test unit has the faster CPU, along with a beefed-up 40GB hard drive and 256MB of RAM.

Considering the diminutive dimensions, the X31 serves up a massive range of connections: two USB 2.0 ports, FireWire, parallel printer, 56K modem, 802.11b Wi-Fi and Gigabit Ethernet, plus VGA-out.

The more obvious concession to size and weight is the lack of any removable storage. Those running the X31 from a network may be able to make do without a CD-ROM drive, but that's not the primary

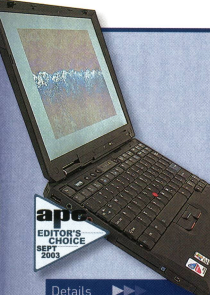
environment for an ultraportable — we suggest buyers factor in the cost of an external drive to the purchase price. IBM's solutions include the X31 UltraBase dock (\$429), which snaps underneath the X31 and adds a CD-ROM drive and room for an optional second battery.

The X31 also includes a new "mushroom-shaped" head for the track stick, which is far more comfortable and accurate to use than the normal nubbins. And it has the typically superb ThinkPad keyboard, the feel of which belies the unit's overall size.

You don't expect an ultraportable to set speed records, and that's as true of the X31 as any of its rivals (such as Toshiba's slim Portege R100). It chalks up a Mobile Mark 2002 performance score of 146, typical for any Centrino in this configuration, and cruises past the four hour mark during battery testing. Don't expect too much zip with graphics, as a modest 16MB ATI Mobility Radeon GPU drives the 12.1in screen.

As a machine built for a purpose, the X31 excels — you'll be hard pressed to find a more desirable ultraportable PC.

**Matt Overington**



apc  
EDITOR'S  
CHOICE  
SEPT  
2003

## Details

Contact	IBM
Phone	1800 815 154
Online	www.ibm.com.au
Price	From \$3,799 (as tested, \$4,199)
✓	Small, light and powerful.
✗	Relatively expensive; no removable drive.
Verdict	●●●●○

## ITC Millennia 6000

## One in a million

Failing to star in last month's notebook megatest, ITC raises the bar with a Centrino surprise.

Arriving too late to be included in last month's Notebook Labs Challenge, the Millennia 6000 is a vast improvement on the Centrino ITC included in the roundup (APC August, page 70).

Powered by a 1.4GHz Pentium M CPU, this Centrino-based system has a level of performance that game lovers need. Its trump card is the 64MB Mobility Radeon 9000 graphics processor, which does wonders for its 3D abilities — Quake III tests produce a score of 146.8fps at 1,024 x 768 while 3DMark2001 racks up a staggering 7,200.

Battery tests squeeze three hours and 14 minutes of life in both Mobile Mark and Battery Mark. This is far shorter than the five or seven hours that other Centrino-based notebooks are capable of, and 45 minutes short of its advertised four-hour life.

The Mobile Mark rating of 152 would have placed the Millennia tenth in last month's Labs Challenge, falling slightly short of the Acer Travelmate 655 and the Fujitsu E4010 — but

those notebooks are more than \$1,000 dearer.

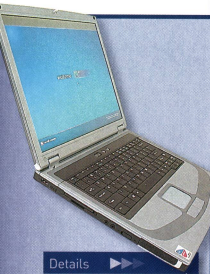
Sporting a two-tone metallic blue case, the Millennia is a sturdy and well constructed. The case is extremely rigid with solid screen hinges and an easy-to-open latch. The 15in screen has ample real estate for business applications and games, with a maximum resolution of 1,400 x 1,050.

With 512MB of RAM the Millennia can handle up to 1GB, and is equipped with a 40GB hard drive which provides plenty of storage space. The only concern is the drive speed, which SiSoftware Sandra index at 10,868KB/s. This is only around 60% of the speeds reported by other Centrino-powered notebooks. Even the ITC Centrino's memory transfer speeds were 1,552MB/s (an excellent figure).

The Millennia packs an 8x DVD Combo drive that reads CDs at 2x, burns CD-Rs at 12x and 10x for CD-RWs. With a four-pin FireWire port, two USB 2.0 ports on the rear, and another USB port on the side, the Millennia provides a reasonable level of connectivity for peripherals.

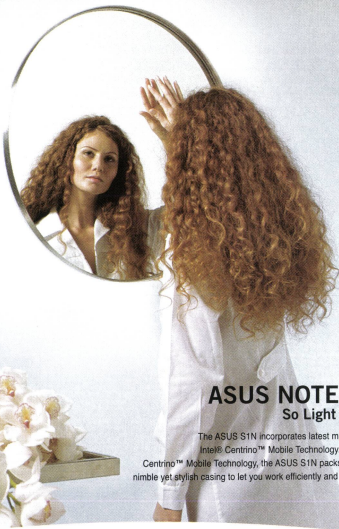
Add to that a pair of legacy serial and parallel ports and you've got a well-rounded notebook.

**Paul Robinson**



## Details

Contact	ITC Mobile Computing
Phone	(08) 94867166
Online	www.itcchannel.net.au
Price	\$3,099
✓	Excellent graphics.
✗	Short battery life.
Verdict	●●●●○



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The ASUS S1N incorporates latest mobile computing technology - Intel® Centrino™ Mobile Technology. Based on Intel's advanced Centrino™ Mobile Technology, the ASUS S1N packs powerful performance in a nimble yet stylish casing to let you work efficiently and look good at the same time.



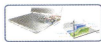
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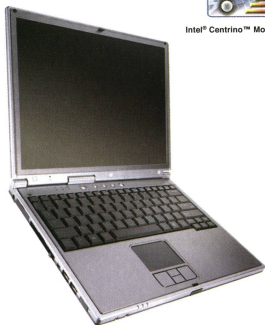
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Wireless connectivity and some features may require you to purchase additional services or external hardware. Availability of public wireless LAN access points limited. System performance measured by MobileMark™ 2002. System performance, battery life, wireless performance and functionality will vary depending on your specific hardware and software configurations. See [http://www.intel.com/products/centrino/more\\_info](http://www.intel.com/products/centrino/more_info) for more information.

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**ASUS**  
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## Multimonitor magic

**Two heads are better than one, even if the brainpower isn't quite all it could be.**

The Hercules 3D Prophet 9200 Dual Display is the first card that APC Labs has received that uses ATI's latest budget GPU. The differences between the company's Radeon 9000 GPU and the 9200 are 8x AGP support, dual-head display and increased clock speeds.

The dual-head function — combined with ATI's HydraVision software — enables using both screens in 2D and 3D applications (assuming the 3D app can support display over multiple monitors).

HydraVision has a multitude of functions in the 2D and 3D realms, including multiple desktop support, desktop management features and hot-key transitions.

A flash demo can be found at: [www.ati.com/companyinfo/glossary/hydravision/hydravision-demo.swf](http://www.ati.com/companyinfo/glossary/hydravision/hydravision-demo.swf).

VGA, DVI and S-Video outputs are available on the back of the card, and the included DVI-to-VGA adaptor allows use of two VGA screens.

GPU cooling is handled by a heatsink and fan. At a glance they look ineffectual, but the Radeon 9200

reference design contains only a passive heatsink, and the cooling solution is sufficient.

DirectX support is limited to version 8.1, so hardware support for the eye-candy in soon-to-be-released games such as Doom III and Half-Life 2 may need a card with DirectX 9.

That said, on advanced games such as Quake III Arena and Unreal Tournament 2003, average rates exceeding 60 frames-per-second were attainable in DirectX 8 at resolutions of 1,024 x 768 with 32-bit colour on a single screen.

The card can display resolutions of 2,048 x 1,536 at 85Hz on both screens simultaneously in both 2D and 3D environments. Realistically though you'd use lower resolutions for gaming apps, especially when making use of both displays.

The four pixel pipelines and two vertex shaders in the GPU, combined with 128MB of DDR RAM, is enough power to keep an acceptable frame rate at 800 x 600 on each screen.

Multimonitor monkeys will appreciate dual-screen gaming but may want more power. With luck, this innovation is a sign of things to come.

**Jarrold Spiga**

## nVidia GeForce FX5900

## Just quietly

**nVidia's latest flagship GPU can be kept cool and quiet, unlike the old GeForce FX5800.**

GeForce FX5800, the previous top model GPU from nVidia, ran hot and required bulky, noisy cooling mechanisms. The cooling solution for the FX5900 is significantly quieter than on FX5800 cards — so quiet that the fans of our Pentium 4 3.0GHz CPU and MSI 875P Neo motherboard made more noise.

The unique heatsink and fan design catches the eye. There are three fans: two for regular operation and a backup. If a primary fan fails, the third kicks-in so that air continues to flow through the heatsink fins, thus preventing damage to the GPU and RAM.

We tested this feature by sticking a finger in one of the primary fans. Sure enough, the redundant fan kicked in after a second.

While it's physically possible to install a PCI card in the first slot on the back of a PC, it would restrict the airflow to the AGP card fans, so you probably wouldn't want to.

Only the most adventurous of tinkers would attempt to replace the fans, which are built into the heatsink.

The unit features 128MB of DDR memory, with the engine clock and RAMDAC running at 400MHz. Additionally, there were some impressive benchmarking results.

While the synthetic benchmark score of 15512 under 3DMark2001 ranked this card behind those using ATI Radeon 9800 GPUs, real-world results told a different story.

At a resolution of 1,024 x 768, playing Quake III at a blistering 355 frames-per-second was a dream.

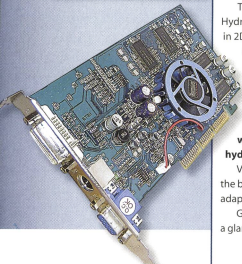
A dangle ships with the card for handling S-Video/composite television input and output, and dual-head mode is supported when using both VGA and DVI outputs (a DVI-to-VGA converter is included). The S-Video output though was noticeably blurry on a TV.

And the card's packaging is interesting. Shipping in a waterproof, padded tech bag, at first it appeared to be another notebook for review. It's a handy bonus for a card priced slightly below ATI's competing product.

**Jarrold Spiga**

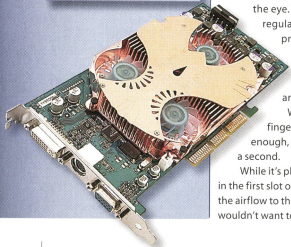
### Details

Contact	Guillemot
Phone	(02) 8303 1818
Online	<a href="http://www.guillemot.com.au">www.guillemot.com.au</a>
Price	\$369
✓	Multimonitor 3D action; HydraVision software.
✗	Only has DirectX 8.1 support.
Verdict	●●●●○



### Details

Contact	Australia IT
Phone	(03) 9543 5855
Online	<a href="http://www.australia.it.com.au">www.australia.it.com.au</a>
Price	\$493
✓	Quiet cooling; good performance.
✗	Blurry analogue S-Video output.
Verdict	●●●●○





## ASUS NOTEBOOK PC

Slim in Size ; Rich in Features

The ASUS M2N incorporates latest mobile computing technology - Intel® Centrino™ Mobile Technology. Its modular design allows flexibility for swapping internal CD, DVD, Combo, CD-RW floppy or a 2nd hard drive. Use high-speed external peripherals such as hard drives, scanners, or digital camcorders at SCSI speeds with built-in IEEE 1394 and USB2.0 support. Of course standard features such as integrated LAN, modem and PCMCIA support are also available.



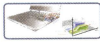
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ADTD II thermal solution & Power4 Gear to extend battery life



### M2N

M24N150CM

14.1" TFT XGA

Intel® Pentium® M Processor 1.5 GHz

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Intel® 855 Chipset Family

CD-RW/DVD COMBO Drive Built in

256MB Memory

40G HDD

XP Professional

**\$3,099 AUD Inc. GST**

Wireless connectivity and some features may require you to purchase additional services or external hardware. Availability of public wireless LAN access points limited. System performance measured by MobileMark® 2002. System performance, battery life, wireless performance and functionality will vary depending on your specific hardware and software configurations. See [http://www.intel.com/products/centrinomore\\_info](http://www.intel.com/products/centrinomore_info) for more information.

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HEART OF TECHNOLOGY

## Contributors welcome

**Macromedia has stepped back to the plate with the next version of this niche product.**

Rarely is a product cheaper than its predecessor, but Macromedia has shaved \$21 off Contribute 2.0 (thanks to the strength of the Aussie dollar). Upgraders who get in before September 30 via Macromedia's Web site ([www.macromedia.com](http://www.macromedia.com)) will be treated to a price of \$16 (usually \$121.50) and Mac users can benefit from the simplicity Contribute

2.0 brings to Web publishing with Contribute 2.0 for OS X.

Contribute 2.0 is the first Macromedia product to ship with activation, requiring a call to the vendor should the software ever need reinstalling. Contrary to emerging trends, Macromedia's more relaxed licensing allows the product to be installed on two PCs to cater for the common home/work requirements.

In what could threaten online documentation products such

as Adobe Acrobat, Contribute 2.0 ships with FlashPaper, a bandwidth-saving document format based on Flash. It converts any printable document to FlashPaper, then embeds it in a page. A printer driver takes care of the conversion, using methods similar to Acrobat's Distiller printer driver.

Contribute 2.0 heavily focuses on security and adds Secure FTP as a connection method to the current FTP and local network choices.

Although not difficult to integrate, Macromedia is the first major player to bundle PayPal support as an installation option. There are wizards for Buy Now, Add to Cart and View Cart, and Subscription PayPal buttons. They ask questions, then embed the appropriate hidden form fields into the page.

Contribute 2.0 retains all the features that made the predecessor such a success in its niche. It's a great product for when the delegation of online content publication is best distributed among experts in the subject matter who don't necessarily have any HTML skills, rather than burdening the inhouse Web developer who needs to concentrate on producing new sites or online applications.

**Paul Robinson**

## LaCie Big Disk

## Happily married

**LaCie packs performance, portability and storage aplenty into this solid silver box.**

There's nothing wrong with most external hard drives. They have an average 100GB of storage and a fast USB 2.0 pipeline to your desktop or notebook. But that hasn't stopped LaCie from going a step further with Big Disk, marrying two 3.5in 200GB disks into a single 400GB drive.

And it's fast, adding the new FireWire 800 interface to the roster. The spec is officially rated at 800Mbit/s — twice the speed of FireWire's conventional 400Mbit/s — although those ratios don't apply in the real world.

Through FireWire 800, the Big Disk transfers 2GB of mixed-size files in one minute and twenty seconds — only about 17% faster than standard FireWire (1min 36 sec). USB 2.0 manages the move in 1 min 42 sec, putting paid to the claim to be faster than FireWire 480Mbit/s throughput.

It's a different story in drive DiskBench 99 benchmarks, where a flat line in a graph indicates a bottleneck in the interface, clamping the maximum speed. Big Disk has almost perfectly flat lines for the data transfer rate under FireWire 400 and USB 2.0,

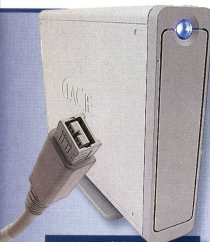
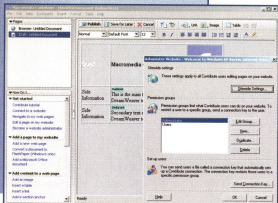
rather than an incline that would match the faster speeds available at the platter's outer edge and slower rate towards the centre.

But hook up FireWire 800 and the Big Drive smashes the bottleneck, for a standard chart with an outer disk speed of 56MB/s and inner speed of 35.2MB/s. This is because the FireWire 800 interface provides two extra cables, with a third left open for expansion, resulting in a new nine-pin connector.

So far, the only machines fitted with FireWire 800 are Apple's top-line PowerBook and Power Mac G5 — enjoying it on your PC calls for a \$199 adaptor card. However, we expect FireWire 800 will appear in the next wave of desktop PCs, so at least the Big Disk has a degree of future-proofing. In the meantime, LaCie's bundled interface adaptor lets you use the Big Disk on a FireWire 400 port, albeit at reduced speeds.

Tests also revealed a performance dip of around 5MB/s across the FireWire and USB 2.0 interfaces when the Big Drive swaps between its two 200GB hard disks. Presented as one huge drive by the Big Drive's inbuilt controller, this employs NRAID technology to fill the master, and then the slave drive.

**Paul Robinson**



Details	▶▶
Contact	LaCie Australia
Phone	(02) 9669 6900
Online	<a href="http://www.lacie.com.au">www.lacie.com.au</a>
Price	\$1,299
✓	Great performance.
✗	Expensive [\$3.50/MB].
Verdict	●●●●○



Intel® Pentium® 4 Processor

## ASUS NOTEBOOK PC

Your Reliable Partner

Reliability is a must in this "survival of the fittest" world. The ASUS A2 notebook packs a full-spectrum of practical features and stable performance for different situations. Whether you are in a business conference, lounging at a cafe or tanning on the beach, the A2 is your trustworthy and value-rich companion.



### A2H

A24H240CM

14" TFT

Intel® Pentium 4 Processor 2.4GHz

256MB Memory

40G HDD

CD-RW/DVD COMBO Drive

Free Wireless LAN PC Card

Multi-Card Reader Supports MMC/SD/SM cards

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**\$2,499 AUD Inc. GST**

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# Reviews

## Philips DesXcape 150DM

### Remote-control PC

**Are you sick of the office? Then move your computing to a more comfortable place.**

The DesXcape is one of a new generation of Smart Displays that doubles as a mobile tablet or monitor. It comprises a wireless keyboard, trackpad and monitor set that can be detached from a PC and moved around the house.

A base station connects to the PC's video, keyboard, mouse and USB ports and acts as a transmitter, broadcasting signals to the wireless PC controls via Wi-Fi. You're not limited to keyboard entry though, as the display also features a touchscreen film and can be configured as a tablet. What's more, it can be used in conjunction with any 802.11b access point.

DesXcape only works with PCs running Windows XP Professional with Service Pack 1 and not the earlier version, or XP Home. You also must install Smart Display Services and configure the screen as a remote terminal for the deskbound PC (or PCs) on your network. With the screen plugged into its base station, it acts as a regular monitor; once removed, the user is presented with a login screen.

It relies on the remote database protocol (RDB) and 802.11b wireless to display the image, which renders too slowly for graphics work or gaming, but is acceptable for most office tasks and Web surfing.

The monitor is clear and bright — you can adjust the contrast, brightness and other settings when it's attached to the base station, but not when you're mobile. The 15in screen is a little bulky to comfortably use in the hand, but it's equipped with a stand for table operation.

The 88-key notebook-style keyboard includes a small trackpad, so you don't have to hunt down a wireless mouse if you don't like the idea of pointing using the pen and tablet.

Under testing, the range varies from 10 to 25 metres, depending on the number of walls and solid objects degrading the signal, but this is ample for most work environments or houses.

At \$3,499, the DesXcape won't be finding its way into many offices and homes, but expect smart displays to continue in the near future. This is a growing market segment that will only become more developed and refined over time.

**Matt Overington**

#### Details

Contact	Philips
Phone	1800 009 300
Online	www.philips.com.au
Price	\$3,499
✓	Freedom of movement.
✗	Generally considered expensive...
Verdict	●●●○○

## Corinex Intelligent PowerNet

### Socket rocket fizzles

**A cool concept, but this power line networking offering hardly impresses.**

These are interesting times for networking. With the increasing adoption of Gigabit Ethernet and wireless networks, it's possible to network via the existing power infrastructure in your building.

The Corinex Intelligent PowerNet's maximum bandwidth is 14Mbit/s. Hardly a speed demon, plus it's a bit pricey.

However, the PowerNet is easy to install and use. This means it's perfect for non-techie types who are networking computers in a SOHO because of course there's no cabling running in the home and no need to fiddle with a complex wireless solutions.

The concept works like this: the 50Hz AC power signal acts as a carrier wave for the data signal that's modulated using Orthogonal Frequency Division Multiplexing (OFDM). This type of modulation provides a high level of data reliability in a noisy system — perfect for an AC power circuit.

You install by plugging the adaptor into a PC, powering it on, and installing the PowerNet tool. The Ethernet version requires proper configuration of

the network cards with a valid IP and a subnet; the instruction manual guides those who are unfamiliar with the process.

Transfer speed suffers when used in a complex or large power grid because the products have a maximum optimal range of 200m and a maximum range of 400m. Testing in a multi-storey building produced speeds averaging 254.9KB/s with a peak of 354.9KB/s. Testing in a home environment produced marginally better speeds of 268.3KB/s on average, with a maximum transfer rate of 401.2KB/s.

Security with such a system is an issue considering that anyone with a power point on such a network would have unrestricted access. PowerNet provides 56-bit DES link encryption, offering comparable security to wireless Ethernet protocol (WEP) on wireless networks.

Available in Ethernet- and USB-adaptor models, as well as via an internal PCI card, the PowerNet series provides connectivity in a number of forms.

The concept of networking via a pre-existing infrastructure could be particularly appealing, but the \$199 unit price may hurt when kitting out more than a couple of PCs.

**Paul Robinson**

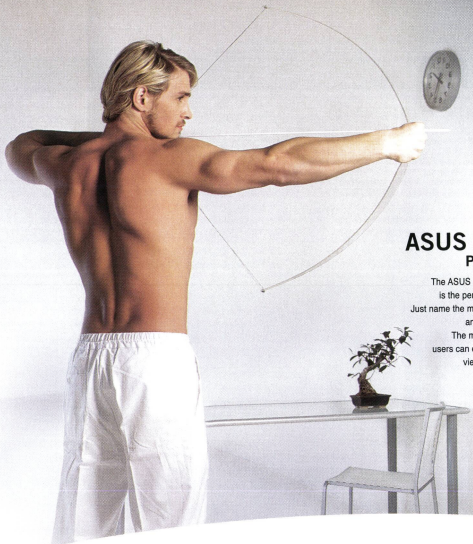


#### Details

Contact	SkyNetGlobal
Phone	(02) 8251 3800
Online	www.skynetglobal.com
Price	\$199
✓	Easy installation.
✗	Slow; relatively pricey...
Verdict	●●●○○



Intel® Pentium® 4 Processor



## ASUS NOTEBOOK PC Paramount of Performance

The ASUS L5, the flagship of the ASUS notebook fleet, is the perfect notebook if the best is what you desire. Just name the most advanced features in mobile computing, and you will find them in this powerful system. The most advanced technology, ASUS ACE View, users can enjoy the best quality LCD with the broadest viewing angle and the best resolution/contrast.



### L5

L58C280DR

15" TFT SXGA+

Intel® Pentium® 4 Processor 2.8GHz

ATI Radeon 9000 64MB DDR External Video Memory

DVD-RW Drive Built in

512MB Memory

80G HDD

Integrated Wireless LAN

XP PRO

**\$3,999 AUD Inc. GST**

## Crystal clear?

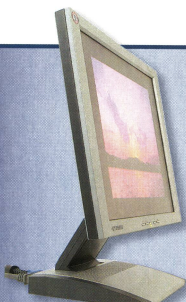
**This 17in TFT has excellent picture clarity, though it's not as sleek as you'd think.**

One selling point of LCDs is that they maximise desk space, but this 17in Hyundai ImageQuest Q17 is barely able to do this. The panel's VGA, DVI (optional) and power cables protrude from the back of the base, negating most of the space that's supposedly saved.

When the unit is wall-mounted, the cables emerge from behind the top of the screen. However, the base has a few redeeming features: a flexible two-hinge design; built-in 2W, two-channel speakers; and input and headphone jacks. The panel can sit directly on the desk or 100mm above it, depending on the user's eye-level.

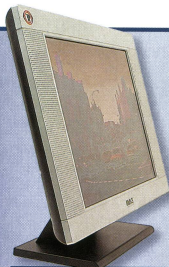
An optional two-port USB hub can be built into the monitor stand but it won't be powered by the screen — power is drawn from the USB uplink cable.

The display is crystal clear at its native resolution of 1,280 x 1,024 and its contrast ratio of 450:1 means it's easy to differentiate between the darkest shades of grey and black. As with most TFTs, the brightest shades are saturated.



## Details

Contact	Synnex
Phone	1300 880 038
Online	www.synnex.com.au
Price	\$1,039
✓	Picture quality; speakers
✗	Cable layout; saturated brights
Verdict	●●●○



## Details

Contact	Com-Tek
Phone	(03) 9329 2388
Online	www.com-tek.com.au
Price	\$749
✓	Value price
✗	Power hungry
Verdict	●●●○

## Read all about it

**MAG Innovision's 17in TFT panel may be a bargain price but it's not all perfect, so buyer beware.**

For the budget-conscious, the LT765S is a decent TFT screen, though you may want to check it out more before you hand over your hard-earned cash.

Our test sample had two pixel defects in different areas of the screen — one permanently green, another permanently blue. This falls within the ISO 13406-2 standard for acceptable pixel defects, but the company won't replace screens with fewer than five defects.

The 17in viewable screen has a native resolution of 1,280 x 1,024, and allows for vertical refresh rates of up to 75Hz. Featuring a 0.264mm dot pitch, we found the image to be as sharp as you'd expect from a TFT, although some colour convergence was noticeable under the rigorous DisplayMate tests.

A response time of 16ms adequately showed action video sequences without ghosting. Other positive test results included a gamma measurement of 2.1, minimal streaking, and no colour intensity fluctuation across the screen.

Brightness of 250 candelas-per-square metre is suitable for use in all but the brightest environments,

With a luminance of 260 candelas per square metre, the Q17 is bright and suitable for high-glare environments.

The monitor is also ideal for action games and DVDs because the screen latency of 20ms is low enough to eliminate ghosting and shadowing. Unlit or otherwise, defective pixels would be a major deterrent for many, but there were no pixel or sub-pixel anomalies in the test panel.

The Q17 did well in DisplayMate testing: APL tests showed no pixel shift or screen intensity changes; streaking was noticeable when darker backgrounds were displayed; gamma measured at an acceptable 2.1. There were some pixel-tracking problems, but the clock phase control in the OSD eliminated them.

The OSD is simple and easy to use, allowing adjustment of brightness, contrast, clock, clock phase, colour temperature, language and OSD position parameters.

Auto screen calibration didn't always give the best results on the first attempt, but it came close, leaving us to execute final touch-ups, or to gamble on running the function again.

**Jarrod Spiga**

## MAG Innovision LT765S

though the contrast ratio of 400:1 made it difficult to differentiate between subtle tone changes.

A pair of 2-watt speakers is built into the MAG screen's side borders whose volume is adjusted using the up and down OSD controls.

Menu and power buttons are on either side of the auto-calibrate key: this function adjusts only phase and horizontal and vertical width — colour level and temperature need to be manually adjusted.

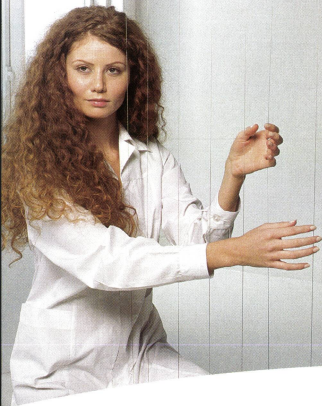
The black base of the LT765S is rock-steady and, fortunately, the hinge has the right amount of give. However, tilt is limited to five degrees forward, 45 degrees back, and the viewable angle is around 10 degrees. This means that you're limited to where you can view the screen.

The power and VGA cables plug into the back of the screen neatly through the hinge, while audio-in and audio-out plugs are seated to one side.

Power consumption sits at 60W — considerably less than that of a CRT, but about one-third more than most 17in LCDs.

Considering the initial outlay, this ongoing cost shouldn't put off too many potential new buyers of this TFT.

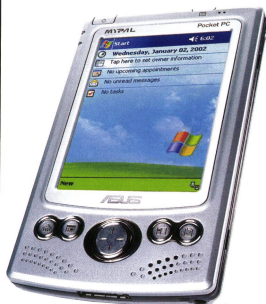
**Jarrod Spiga**



## MYPAL A620

The Thinnest Pocket PC with Built-in CF slot

What can PDAs do nowadays? ASUS' MyPal A620 Pocket PC supports a full range of peripherals and accessories, providing application expansion for Internet access, wireless communications, audio/video enjoyment and business-related functions.



## MYPAL A620

Power CPU: Intel® latest CPU PXA255 400 MHz

New Software: Microsoft® Pocket PC 2003

Brilliant Display: 65,536-Color 3.5" Transflective LCD

Battery Life: Up to 19 hours

Light Weight: 141g

Ultra Slim: 13.3mm

Infrared: FIR/SIR

Expansion Slot: CF Type II Card Slot

ASUS New Technology "SmartKeeper" Enabled. Never let data lost.

**\$799 AUD Inc. GST**



The exclusive ASUS SmartKeeper technology automatically backs up existing system status when power level is low. You can now relax, because your important files are in good hands

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AVIC Computers  
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1300 369 838  
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Princeton Computers  
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03 9248 0238

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Top 6 Computers

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03 9884 6495  
03 9899 4424  
03 9898 0788  
03 9877 7571  
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**ASUS**  
HEART OF TECHNOLOGY



## Must-see mobos

If you're building your own bespoke box, or overhauling the foundations of your current system, it all starts with the motherboard. David Lin rounds up 15 leading contenders for your upgrade dollar.

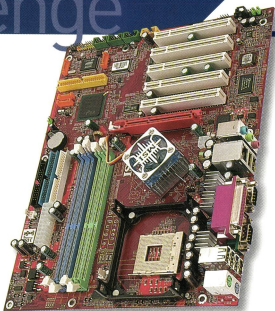
While CPU speeds continue to climb, the frontside bus (FSB) has taken the most significant stride forward. Less than 12 months after Intel upped its P4 platform's FSB from 400MHz to 533MHz, it's up to a staggering 800MHz, just as the 3GHz Northwood-B Pentium 4 chip arrives.

This is set to remain the peak FSB speed for at least 12 months, and the matching silicon of Intel's Springdale (865PE) and Canterwood (875P) chipsets is equally future-proof with native Serial ATA (SATA), SATA RAID and, most importantly, support for PC3200 (DDR400) SD-RAM memory, which seems to have won over RD-RAM.

Also in the 800MHz ranks is the SiS648FX chipset — a down-specced alternative to Springdale and Canterwood. It means you forego native SATA, while DDR400 memory support is single-channel compared to Intel's dual. Our tests showed negligible difference between single and dual for day-to-day office apps and 2D graphics. The dual-channel boost kicks in at the pointy end of performance, driven by 3D gaming, multimedia content production and maths-heavy applications. (A Celeron can be dropped onto any of these slabs for these features and modern niceties such as onboard networking, USB 2.0 and FireWire, and still leave your CPU upgrade path open.)

The new mobos have unpredictable partners for memory. There was a time when everything worked a treat if your RAM matched the chipset's memory spec, but many boards failed to boot, croaked after loading Windows or were unstable during testing. Invariably it came down to the boards not being matched to a particular brand of memory. So if you're spending big on a new mobo, don't take risks with no-name RAM — it could be a false economy. Known-brand memory is cheap enough.

The 15 boards here range in price from \$175 to \$449. Missing in action are Azaa, Intel, LiteOn, Soyo and Tyan, who declined APC's invitation to supply products for this test.



## MSI 875P Neo-FIS2R

It's a tough call, but the MSI 875P Neo-FIS2R shows it has the right stuff for our Editor's Choice award. The caveat is that you have to be willing to pay for the extra 3D performance hit that the Springdale and Canterwood chipsets afford.



While it's a mid-range performer in the Winstone tests, the Neo-FIS2R eats bandwidth for breakfast under graphical benchmarks, clocks more than 300 frames per second (fps) in Quake and pulls the top ranking in 3DMark2003.

The board itself is fire-engine red and everything else is a riot of colour, without any apparent pattern. An active cooler above the 875chip is adorned with a multi-coloured flashing LED.

The board has a nice, compact layout, with the CPU socket positioned a little further back than usual. There's a third IDE connector for ATA/133 RAID and four SATA connectors instead of the usual two. Both Parallel ATA (PATA) and SATA RAID are handled by the Promise PDC2037B controller chip, which allows RAID levels 0, 1 and 0+1 across both IDE and SATA.

Little things — like the connectors and jumpers being clearly labelled, and the colour-coded front panel connectors — are the signs that this is a quality product. The whole package literally bursts out of the box with all the cables, brackets, connectors, manuals and drivers.

While the added functionality of brackets with audio, FireWire, USB 2.0 ports and even diagnostic LEDs is welcome, surely there must be some way to offload these features onto the motherboard proper without crowding it too much. On the other hand, the choice is good, even if there is a little too much of it. It only serves to increase the overall worth of this board.

In a gathering of similar motherboards, this one stood out just enough from some other outstanding candidates. It's one of the most expensive, but good value.

### Details

Contact	MSI Computer
Phone	(02) 9748 0070
Online	www.msi.com.au
Price	\$430
✓	Performance; fully featured.
✗	Too many brackets.
Verdict	●●●●●

## How we tested

Each motherboard was fitted with a 3GHz Intel Pentium 4 CPU, 120GB Seagate Barracuda SATA V hard disk, 128MB Radeon 9800 Pro AGP card and a pair of 256MB Kingston ValueRAM KVR400X64C25 PC3200 memory modules. Boards lacking Serial ATA got a 250GB Maxtor MAXLine Plus II 7,200rpm ATA/133 drive. Video cards ran ATI Catalyst drivers; boards with onboard graphics used inbuilt adaptors. Each board had Windows XP Pro Service Pack 1, fully updated, as well as its latest BIOS and drivers. Tests included Business Winstone 2002, Multimedia Content Creation Winstone 2003, WinBench 99 v2.0 ([www.ctestinglabs.com](http://www.ctestinglabs.com)), BAPCO SYSmark 2002, MadOnion 3DMark2001 Pro and 3DMark2003 ([www.madonion.com](http://www.madonion.com)) and the Quake III Arena demo.

## Abit IC7-G

We reviewed the Abit IC7-G Canterwood board a few months ago (APC July, page 44), and we're happy to say that comparing it with the other motherboards only cements our opinion.

We raised most of the benchmarks by a few notches this time around, with the addition of a Radeon 9800 Pro AGP card and Serial ATA hard disk to our test bench. The biggest increase is in the graphical benchmark scores, where the IC7-G soars up to 17,213 3DMarks.

Abit's presentation of the IC7-G is thorough and provides everything you need, although without the pomp of our Editor's Choice, the MSI 875P Neo-FIS2R. The classy board layout has a subtle colour scheme, and all primary connectors and jumpers are clearly labelled. The comprehensive array of back-panel ports is a model other vendors should mimic.

The only thing this board lacks is IDE RAID, although Abit manages to make amends by fitting four SATA ports, and offers RAID 0 and 1

through the Si1312 controller. The test board came with a loose SATA drive connector that frequently prevented the system from booting (no other boards in the roundup had this problem). Admittedly, it takes only a wiggle to fully engage the connector, but this could be something to look out for.



Details	
Contact	Altech Computers
Phone	(02) 9735 5655
Online	www.altech.com.au
Price	\$385
✓	Performance.
✗	No IDE RAID.
Verdict	●●●●○

## Albatron PX865PE Proll

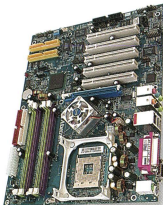
This is one of the best Springdale boards in the roundup, and Albatron isn't shy in spruiking the PX865PE Proll's potential for even greater speed increases — an appendix in the manual is dedicated to overclocking options in the BIOS.

The board layout is typical except in the placement of the floppy connector at the bottom, a bank of DIP switches for activating the voice diagnostics, AGP protection, and a toggle between the primary and backup BIOS.

Rear-panel ports include two rows of hard-wired audio ports for rear and centre channels, leaving more room for expansion cards. A separate bracket sports a range of additional SPDIF audio ports, and the active cooler atop the 865 chip has a flashing blue LED.

ATA/133 RAID levels 0 and 1 are available through the Promise PDC20276 chip, but SATA is restricted to RAID 0 through the ICH5R chip.

Benchmark results are reasonably impressive across the board, typified by the SYSmark score of 294 and the 3DMark2003 score of 5,744. The PX865PE Proll will plant a grin on the face of many system tweekers if they make some judicious modifications.



Details	
Contact	Global Business Technology
Phone	(02) 8718 8888
Online	www.gbt.com.au
Price	\$309
✓	Fast overall performance.
✗	Unusual sound CODEC support.
Verdict	●●●●○

## AOpen AX45G Max

Based on the Springdale-G chipset, AOpen's AX45G Max comes with both onboard graphics and AGP slots. Fitting an AGP card takes priority over the onboard adaptor.

The clean-looking black board clumps the drive connectors (floppy, IDE and SATA) towards the front left side which, depending on the size and configuration of your case, could present challenges for running cables. The AX45G Max also places a capacitor so close to the CPU cooler retention frame that the cooler overlaps the frame's edge. As a result, it takes some manipulation to fit the cooler.

Performance is pedestrian under default settings throughout productivity applications, although it picks up in some of the graphical tests.

The hefty kit includes cables, connectors and brackets. FireWire and Broadcom Gigabit Ethernet are included, along with support for SATA RAID 0 or 1, courtesy of the Si1312 adaptor, although IDE RAID is left off the menu. As with other recent AOpen releases,

this board takes a leaf from Gigabyte's book and fits a dual BIOS.

The AX45G Max is a decent Springdale-G board, and while you pay more for it than a non-G motherboard, it's worth considering if you want to stretch your upgrade budget over a period of time. You can use the onboard graphics right away and add an AGP card later.



Details	
Contact	Bluechip Infotech
Phone	(02) 8745 8400
Online	www.bluechipit.com.au
Price	\$390
✓	Graphics and AGP slots.
✗	Average performance.
Verdict	●●●○○

## ASUS P4P800

The ASUS P4P800 Springdale board tries hard, but it could be better. The overall SYSmark score of 279 doesn't set the test bench on fire, and it's just as unimpressive in high-bandwidth tests such as 3DMark2003, with a score of 5,386.

ASUS is one of the "big three" of Taiwanese motherboard manufacture, but its P4P800 simply can't cut it against the Gigabyte and MSI 865-based boards.

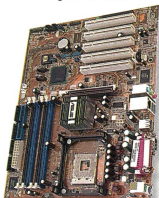
The board's physical characteristics are plain, and the layout plants a tall heatsink above the 865 chip.

The manufacturer also has a preference for its proprietary Wi-Fi connector and 3Com's Gigabit Ethernet chip, instead of the more common Broadcom or Intel chips.

However, the P4P800 was stable at every step of our testing under default settings, and we're certain that it can be pushed a lot harder, especially if the user delves into the advanced-option areas of the AMI BIOS. Each tweak is outlined impressively there. Many motherboards

fall short by not helping owners learn how to take best advantage of their "fiddle factor", but this isn't one of them.

But probably the P4P800's most annoying trait is the proximity of the DIMMs to the AGP slot, making it tricky to swap memory without first removing the AGP card.



Details	▶▶▶
Contact	Cassa Australia
Phone	(07) 3256 1999
Online	www.cassa.com.au
Price	\$280
✓	Easily configured BIOS.
✗	Lacklustre performance.
Verdict	●●●○○

## ASUS P4S800

Considering how many corners ASUS has cut, we're surprised at the punch behind this low-price board.

The Si5648FX chipset qualifies the P4S800 for this roundup by virtue of its 800MHz FSB and support for PC3200/DDR400 memory, but the memory runs only as single channel. Don't bother to go looking for FireWire headers or ports, SATA or RAID, and forget about Gigabit Ethernet. The inclusions list stops cold at the likes of 10/100 Ethernet, USB 2.0 and audio onboard.

It's all pretty standard fare, but judging by the PCB for extra ICs and connectors, the blueprint allows for these to be fitted at the factory on a separate, and no doubt more expensive, production run.

Performance is down on the board's dual-channel-memory brethren, but not so much as to discount its merits as an affordable solution. In office-productivity testing, the P4S800 gives nothing away to the Springdale and Canterwood competitors. The SYSmark of 297 shames some dual-channel boards, while the 48.8 Multimedia Content

Creation Winstone equals the Canterwood-based Epox 4PCA3+ — which is double the price of the P4S800.

This budget board can't deliver the throughput of the champions for 3D apps, but it doesn't have to: if your needs are less demanding, it gives you a hot P4 or P4-ready system, with plenty of change.



Details	▶▶▶
Contact	Cassa Australia
Phone	(07) 3256 1999
Online	www.cassa.com.au
Price	\$175
✓	Price.
✗	Lacking high-end features.
Verdict	●●●○○

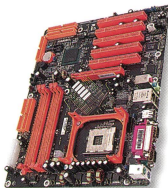
## DFI LANParty Pro875

If the name doesn't give it away, the packaging will: this mobo is aimed at multiplayer gamers, especially those who tote their PCs to weekend fragfests. Unfortunately, this set will find the LANParty Pro875 a bit of a limp noodle. While it performs well in Business Winstone and Multimedia Content Creation Winstone (31.1 and 48.4 respectively), it trails the pack in the more intensive graphical tests — where gamers need to see real grunt.

Beneath a colour scheme mating a black PCB to a fluoro-orange everything-else, DFI has, rather oddly, put a lot of work into beefing up the board's storage capabilities. In addition to Serial ATA support for RAID 0 (supplied by the ICH5R chip, with RAID 1 in the works), the HighPoint HPT370/372N controller chip extends PATA RAID to 0, 1, 0+1 and a variety called 1.5, which appears to be similar to 0+1's striping and mirroring combo, but needs only two drives instead of 0+1's four.

The oversized box has compartments for thermal paste, brackets, cables and connectors. Two canny additions for DFI's target market:

a 5.25in drive bay module serving up front-mounted USB 2.0, audio ports and any other corresponding headers on the motherboard; and a carry kit to make the case easier to transport. However, we think there are better-value boards to put inside that case.



Details	▶▶▶
Contact	Multite Technology Distribution
Phone	1300 369 985
Online	www.distribution.multimedia.com
Price	\$439
✓	Gamer-friendly extras.
✗	Gamer-unfriendly performance.
Verdict	●●○○○

## ESC Photon PFI

ECs (Elitegroup Computer Systems) is one of Taiwan's most prolific OEM motherboard manufacturers, but most of its boards are badged under another company's name.

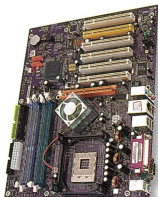
The new Photon PFI ships in loud retail packaging, and the board itself is encased in a clear plastic shell surrounded by quality cables and a spare BIOS.

The purple PCB is dotted with several other colours for slots and connectors — including FireWire and optional 3Com Gigabit LAN — and a discrete active cooler for the 865 Northbridge chip. Unfortunately, the board has only two IDE and two SATA connectors, and neither supports RAID.

The Photon PFI is very quick. Performance is strong in the classic productivity benchmarks such as SYSmark and Business Winstone, and the 3DMark2001 score of 16,875 is one of the highest in this roundup. It was also one of the few boards that could crack 300fps in the Quake III Arena demo.

The lack of RAID could hold it back, and the BIOS doesn't offer much in the way of enhancements for overclockers.

But if you can overlook these shortcomings, the Photon PFI proves itself as a fast, stable and affordable platform.



Details	
Contact	Protac Australia
Phone	(02) 8748 8888
Online	www.protac.com.au
Price	\$291
✓	Performance for price.
✗	Lacks RAID support.
Verdict	●●●○

## EPoX 4PDA2+

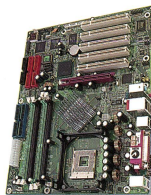
Epox, which sits in the "second tier" of Taiwan's hierarchy of mobo manufacturers, has piled an impressive set of features on top of the Springdale 865 chipset's native capabilities. And like much of the competition, Epox has hedged its bets by supplementing the Intel ICHSR chip with the Silicon Image Sil3112 SATA controller to allow for both RAID 0 and 1.

There's an added bonus of four SATA ports instead of the usual two, although this would make more sense if the 4PDA2+ supported RAID 5, which requires at least three drives.

If you're holding off the move to SATA but still want to run a PATA RAID array, you're covered by the HighPoint HPT372N IDE RAID controller and an additional two IDE connectors that can run at ATA/133 transfer speed.

Scores of 278 for SYSmark and 5,428 in 3DMark2003 are about what we were expecting, and the 4PDA2+ remained stable throughout testing.

It's worth noting that we often find the fastest boards are also the most unstable, and all the speed in the world counts for nothing when the board keeps failing. But that isn't an issue here. The 4PDA2+ is rock solid.



Details	
Contact	Westan
Phone	(03) 9543 7733
Online	www.westan.com.au
Price	\$327
✓	Exceptional RAID storage options.
✗	Lacks RAID 5 support.
Verdict	●●●○

## Double the memory, double the fun

The Pentium 4 Northwood B processor has had two important architectural overhauls: its frontside bus is up from 533MHz to 800MHz; and it now supports dual-channel DDR memory.

Dual-channel memory first made its mark on server and workstation-class chipsets, and its arrival on the desktop has caught Intel's marketing gurus by surprise. Motherboard vendors have rapidly adopted dual-channel DDR chipsets until the technology became a revolution by stealth.

Dual-channel memory uses a memory controller hub (MCH) fitted to the Southbridge on Intel chipsets.

Every clock tick of the memory bus is split into two separate 64-bit chunks, with the MCH reading data from the memory on both the upswing and downswing of each cycle.

This effectively doubles the memory throughput or bandwidth — allowing, for example, dual-channel DDR400 or dual-channel PC3200 DDR SDRAM (the terms are synonymous) to hit peak bandwidth of 6.4GB/s.

In practical terms, double bandwidth doesn't equate to double performance, but the difference is tangible.

The Editor's Choice motherboard in this roundup, MSI's 875P Neo-FIS2R, notches

up 5,957 in 3DMark2003, with 256MB of Kingston ValueRAM modules in dual-channel mode.

When changed to a single-channel memory configuration, we found that the 3DMark2003 dropped back to a significantly lower 5,265.

This isn't just a set of numbers on a spreadsheet — the difference can be seen and translates into jumpy, lagging screens.

If you run high-bandwidth applications — such as 3D modelling, video editing or the latest games — and upgrade to a dual-channel memory system, you'll soon appreciate the difference.



## Gigabyte GA-8PENXP

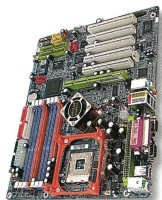
Gigabyte's Springdale-class 8PENXP is the motherboard with the lot. The huge box comes with cables for floppy, IDE and SATA drives; brackets for audio, USB and FireWire ports; a second power regulator (Gigabyte ships these with all its high-end boards); and the board itself.

There are six banks of DIMM slots. However, as with all Springdale and Canterwood boards, there's a ceiling of 4GB of RAM. The 865 chip seems to need the heavy, brass, active cooler, which gets very hot. Special features include a second pair of IDE channels, underwritten by ITE's GigaRAID chip, which supports RAID levels 0, 1, 0+1 and JBOD, and boosts disk transfer to the ATA/133 rate.

There's also a double serve of paired SATA ports, with the second set driven by the SiI3112 controller chip for RAID 0 and 1. And, if four SATA disks aren't enough, Gigabyte sells an optional GC-SATA card, which allows for external connection of a third pair of SATA drives.

The impressive roster doesn't tilt the test bench scores in the right direction, with performance languishing around the middle of the pack.

High points include a Multimedia Content Creation Winstone score of 50.3 and a SYSmark Internet Content Creation score of 421. This may be a board you'd buy more for the extras than the oomph.



Details	
Contact	Rectron
Phone	(03) 9561 6166
Online	www.rectron.com.au
Price	\$399
✓	Excellent storage options.
✗	Northbridge chip runs hot.
Verdict	●●●●○

## Iwill P4CT

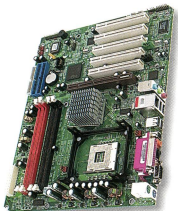
Iwill's Canterwood-based P4CT is a mid-priced, middle-of-the-road performer and, as such, it's only mid-range value. The board's appearance is plain, but this means there aren't any glaring shortcomings or unwelcome surprises in its layout, although RAID is limited to SATA RAID 0.

The back panel deals a full deck of ports, and Iwill hasn't stacked the box with brackets for audio and connectivity, so there's plenty of room for slotting in expansion cards.

The BIOS includes the Taiwanese Iwill Corporation's Smart Settings tweaker's menu for finetuning the CPU clock and memory voltage settings. However, the options aren't as comprehensive as those offered with the Abit IC7-G, Albatron PX865PE ProII or the MSI 865PE Neo2-FIS2R.

It's a good performer, rating 5,761 3DMarks in 3DMark2003, but the P4CT's test scores are average overall. The standard configuration is stable and consistent, a factor we always welcome.

Most of the top motherboards use active coolers on top of their Northbridge chips, and it would be interesting to see if replacing the P4CT's oversize passive cooler with an active module could lift it out of the crowd.



Details	
Contact	BBS Electronics
Phone	(03) 9832 0751
Online	www.bbs.com.sg
Price	\$350
✓	Stable performance.
✗	Only SATA RAID 0; no extra application software.
Verdict	●●●●○

## Octek Rhino 1865PE-A4E

The plainest Springdale board in our roundup is Octek's Rhino 1865PE-A4E. It's just above the bare-minimum configuration for a board based on the 865 chipset, although it hits hard where it matters.

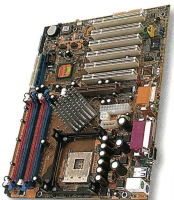
The Award BIOS is unhindered by arcane tweaks so loved by overclockers, contributing to rock-steady stability. The overall SYSmark score of 248 is off the pace, but 3DMark2003's 5,593 is solid and the Multimedia Content Creation Winstone of 48.4 hits the higher limits.

Layout is conventional; there's SATA support for a pair of drives but no RAID at all. FireWire is onboard, but there's no hard-wired port, so if you want to use FireWire you have to buy the optional header and bracket kit.

Concessions are made, due to the smaller size. The 865 Northbridge with an oversized heat sink dominates the centre. Two pairs of DIMM banks come almost to the front edge of the board, where the ATX power connector and floppy drive connector are usually located. The power

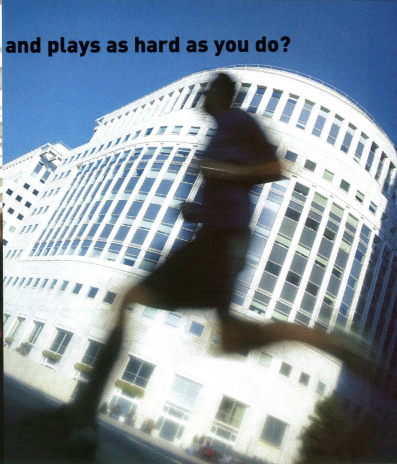
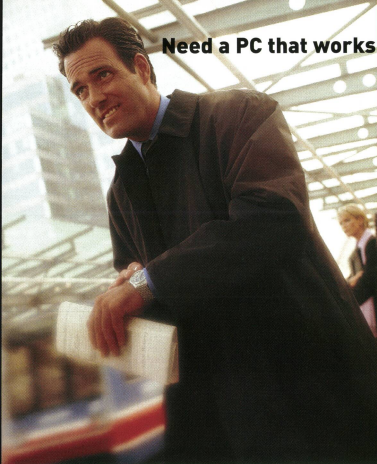
connector moves to behind the 865 Northbridge with the 12v power connector, and the floppy drive finds a home at the bottom of the board.

At first glance, the Rhino seems in need of features, but it's a pleasure to run and respectable in the benchmarks. At \$195, who's arguing?



Details	
Contact	Ocean Office Automation
Phone	1300 132 682
Online	www.octek.com.au
Price	\$195
✓	Fast, stable performance.
✗	Lack of high-end features.
Verdict	●●●●○

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# Labs Challenge

## QDI P4I865A

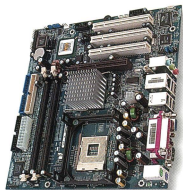
The generous feature set and budget price ensure that this 865-chipset board from QDI Legend will appeal to many.

The layout is unremarkable, apart from momentary confusion between the front panel connectors and the floppy drive.

There's no IDE RAID support; while the manual states that SATA RAID 0 and 1 are available, the absence of a separate SATA RAID controller indicates that the documentation pre-empted the impending release of the RAID 1 driver for the ICH5R controller incoming months.

The P4I865A performs well in SYSmark and Business Winstone traditional office-productivity applications, tallying scores of 297 and 29.9 respectively. But in the graphical tests it dips to 5,371 3Dmarks, and is about 50fps off the pace in Quake.

The unit takes an excessive amount of time to boot — we had the chance to study every pixel on the Windows XP splash screen while waiting for the desktop to appear. There's no questioning the QDI's stability; it simply takes a long time to load up with Windows XP.



Details	▶▶▶
Contact	BCN Technology
Phone	(02) 9648 0888
Online	www.bcn-tech.com.au
Price	\$195
✓	Features; price.
✗	Painfully slow XP boot.
Verdict	●●●●○

## Soltek SL-865PE-L

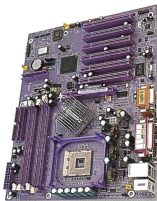
This Soltek Springdale-based board springs several surprises, starting with the amazing price of \$192. This is due to its bare bones nature. One board in the range even comes without networking.

We opted for the NIC-equipped board, which means foregoing creature comforts such as FireWire and RAID support for IDE and SATA. In fact, apart from the sound chip, this is about as stripped-down an 865 board as you'll ever see.

Thankfully, the plain appointments don't translate into plain performance. The board breezed through the tests, easily crossing the 300 SYSmarks barrier — and the only other board to do so is the Epox 4PDA2+, which uses the Canterwood chipset. It didn't fare as well in the Winstone benchmarks, but did return a score of 5,746 in 3Dmark2003.

The AMI BIOS allows for easy CPU-clocking and manipulation of AGP, memory and CPU voltage. It's not the best example of a Springdale motherboard, but it's efficient, well-documented and good value if you don't need the extra goodies.

The board's gaudy colour scheme may not be to your taste — believe it or not, a mauve PCB adorned with a forest of purple PCI slots, drive connectors, DIMM banks and the CPU bay.



Details	▶▶▶
Contact	Altech Computers
Phone	(02) 9735 5655
Online	www.altech.com.au
Price	\$192
✓	Cheap but efficient.
✗	Lacks features
Verdict	●●●●○

## Supermicro Super P4SC

It uses the Canterwood chipset, but the Super P4SC is the odd one out in this Labs Challenge, because it's not a desktop board. Server and workstation specialist Supermicro sees this board scoring in the small-server arena — echoed by some onboard appointments in line with the rack-server market.

Firstly, it's an 875P board with onboard graphics. The modest ATI Rage XL is PCI-based, with an 8MB buffer, making it less capable in graphics than Springdale-G boards. But pixel-pumping action isn't why you'd use a rack server.

The layout is novel. The CPU socket is much closer to the front and the 875 Northbridge chip occupies the usual CPU space. In the middle, instead of the AGP slot, are four DIMM slots. Storage connectors for floppy and IDE drives are on the left, with a pair of SATA connectors near the DIMM slots. Four PCI slots complete its expansion capabilities. Another nod to the P4SC's role: two Gigabit Ethernet ports.

Not surprisingly, the P4SC fares poorly in benchmarking, which is slanted towards desktop use. It fails to run most of the graphical tests, and those it finished (Winstone and SYSmark) underscored the modest variation between all flavours of motherboard for such simple tasks.



Details	▶▶▶
Contact	Digicor
Phone	(03) 9560 7222
Online	www.digicor.com.au
Price	\$449
✓	Dual Gigabit Ethernet ports.
✗	Suitable for rack server only.
Verdict	●●●●○



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# Labs Challenge

Model	Abit I7-G	Albatron PX865PE ProII	AOpen AX45G Max	ASUS P4P800	ASUS P4S800	DFI LANParty Pro875	ECS Photon PF1
Price	\$385	\$309	\$390	\$280	\$175	\$439	\$291
Contact	Altech Computers	Global Business Technology	Bluechip Infotech	Cassa Australia	Cassa Australia	Multi Technology Distribution	Protac Australia
Phone	(02) 9735 5655	(02) 8718 8888	(02) 8745 8400	(07) 3256 1999	(07) 3256 1999	1300 369 985	(02) 8748 8888
Online	www.altech.com.au	www.gbt.com.au	www.bluechipit.com.au	www.cassa.com.au	www.cassa.com.au	www.distribution.multiimedia.com	www.protac.com.au
Chipset	Intel 875P	Intel 865PE	Intel 865G	Intel 865PE	SiS648FX	Intel 875P	Intel 865PE
Maximum memory (GB)	4	4	4	4	3	4	
BIOS	Award	Award	Award	AMI	Award	Award	Award
FSB (MHz)	533/800	400/533/800	400/533/800	400/533/800	400/533/800	533/800	400/533/800
Dimensions (mm)		305 x 244	305 x 244	305 x 245	305 x 245	305 x 244	304 x 244
DIMM slots	4	4	4	4	3	4	
PCI slots	5	5	6	5	5	5	6
Other expansion slots	Nil	Nil	Nil	1 x ASUS Wi-Fi connector	1 x ASUS Wi-Fi connector	Nil	1 x CNR
USB 2.0	8		8	8	6	8	8
FireWire header	Yes	Yes	Yes	No	No	No	Yes
Rear-mounted ports (not on brackets)	2 x PS/2, 1 x serial, 1 x parallel, 4 x USB, 1 x FireWire, 1 x RJ45, 1 x line-in, 1 x front speakers, 1 x rear speakers, 1 x sub, 1 x SPDIF (optical) in, 1 x SPDIF (optical) out	2 x PS/2, 1 x serial, 1 x parallel, 2 x USB, 1 x RJ45, 1 x line-in, 1 x front speaker, 1 x mic, 1 x rear speaker, 1 x surround speaker, 1 x centre/sub	2 x PS/2, 1 x serial, 1 x parallel, 1 x VGA, 6 x USB, 1 x RJ45, 1 x line-in, 1 x line-out, 1 x mic	2 x PS/2, 1 x serial, 1 x parallel, 1 x SPDIF out, 4 x USB, 1 x RJ45, 1 x line-in, 1 x line-out, 1 x mic	2 x PS/2, 1 x serial, 1 x parallel, 1 x SPDIF out, 4 x USB, 1 x RJ45, 1 x line-in, 1 x line-out, 1 x mic	2 x PS/2, 2 x serial, 1 x parallel, 4 x USB, 1 x RJ45, 1 x line-in, 1 x line-out, 1 x mic	2 x PS/2, 1 x serial, 1 x parallel, 1 x FireWire, 4 x USB, 1 x RJ45, 1 x line-in, 1 x line-out, 1 x mic
Ultra ATA support	ATA/100	ATA/100	ATA/100	ATA/100	ATA/133	ATA/100	ATA/100
IDE connectors	2	4	2	2	2	4	2
RAID support	SATA RAID 0, 1	IDE RAID 0, 1 / SATA RAID 0	SATA RAID 0	SATA RAID 0	Nil	IDE RAID 0, 0+1, 1, 5 / SATA RAID 0	Nil
Serial ATA support	ICH5R / SiI3112	ICH5R/POC20276	SiI3112A	ICH5R	Nil	ICH5R	ICH5
LAN support	Intel 82547E1 10/100/1000	Intel 82547E1 10/100/1000	Broadcom 5702X 10/100/1000	3Com 3C940 10/100/1000	VIA VT6103 10/100	Intel 82547E1 10/100/1000	3Com 3C940 10/100/1000
Integrated sound	Realtek ALC650	VIA VT1720	Realtek ALC650	Analog Devices AD1985	Analog Devices AD1980	C-Media CM9739A	C-Media CM9739A
Sound support	5.1	8-channel	5.1	5.1	5.1	5.1	5.1
Cables and connectors	2 x SATA, 2 x SATA power, 1 x IDE-SATA converter, 2 x rounded IDE, 2 x USB and 2 x FireWire (on bracket)	2 x IDE, 1 x floppy, 1 x SATA, 1 x SATA power, 1 x MIDI/games & serial (on bracket), 4 x USB (on bracket), 2 x FireWire (on bracket), 2 x SPDIF/optical in & 1 x mic & 1 x headphone (on bracket)	1 x IDE, 2 x SATA, 1 x SATA power, 1 x serial (on bracket), 1 x MIDI/games & 2 x USB (on bracket), 2 x FireWire (on bracket), 2 x SPDIF in / 2 x SPDIF out (on bracket)	2 x IDE, 1 x floppy, 2 x SATA, 2 x jumper blocks	1 x floppy, 1 x IDE	1 x rounded floppy, 2 x rounded IDE, 2 x SATA, 2 x SATA power, 1 x SPDIF in & 1 x SPDIF out (on bracket), 1 x MIDI/games (on bracket)	2 x rounded IDE, 2 x SATA, 2 x SPDIF out (on bracket), 2 x USB & 1 x FireWire (on bracket)
SYSmark2002							
Overall	283	294	-	279	297	-	266
Internet Content Creation	422	426	358	405	427	427	401
Office Productivity	190	203	174	192	206		177
Business Winstone	30.8	30.2	27.1	30.1	30.3	31.1	30.2
MCC Winstone	48	49.1	41.3	47.1	48.8	48.4	
3DMark2001 Pro	17,213	16,435	2,774	14,606	13,491	14,984	16,875
3DMark2003	5,642	5,744		5,386	5,136	5,389	5,612
Quake III Arena (1,024 x 768 x 32-bit)	303.2	298.6	66.2	231.8	214.1	250	302.6

Epox 4PDA2+	Gigabyte GA-8PENXP	Iwill PACT	MSI 875P Neo-FIS2R (MS-6758)	Octek Rhino i865PE-A4E	QDI P4I865A	Soltek 865PE-L	Supermicro Super P4SCE
\$327	\$399	\$350	\$430	\$195	\$195	\$195	\$449
Westan	Rection	BBS Electronics	MSI Computer	Ocean Office Automation	BCN Technology	Altech Computers	Digicor
(03) 9543 7733	(03) 9561 6166	(03) 9832 0751	(02) 9748 0070	1300 132 682	(02) 9648 0888	(02) 9735 5655	(03) 9560 7222
www.westan.com.au	www.rection.com.au	www.bbs.com.sg	www.msi.computer.com.au	www.octek.com.au	www.bcnftech.com.au	www.altech.com.au	www.digicor.com.au
Intel 865PE	Intel 865PE	Intel 875P	Intel 875P	Intel 865PE	Intel 865PE	Intel 865PE	Intel 875P / ATI Rage XL
4	4	4	4	2	4	4	4
Award	Award	Award	533/800	Award	Award	AMI	Award
400/533/800	400/533/800	533/800	533/800	400/533/800	400/533/800	400/533/800	533/800
	305 x 244	304 x 254	305 x 244	304 x 228	304 x 243	305 x 244	305 x 241
4	6	4	4	4	4	4	4
5	5	5	5	6	5	6	4
Nil	1 x DPS slot	Nil	Nil	Nil	1 x CNR	Nil	Nil
8		8	8	8	8	8	8
Yes	Yes	Yes	Yes		Yes	Nil	Nil
2 x PS/2, 1 x serial, 1 x parallel, 4 x USB, 1 x RJ45, 1 x line-in, 1 x line-out, 1 x mic	2 x PS/2, 4 x USB, 2 x serial, 1 x parallel, 1 x RJ45, 1 x line-in, 1 x line-out, 1 x mic	2 x PS/2, 1 x serial, 1 x parallel, 1 x FireWire, 4 x USB, 1 x line-in, 1 x line-out, 1 x centre/sub, 1 x rear speaker	2 x PS/2, 6 x USB, 2 x serial, 1 x parallel, 1 x RJ45, 1 x line-in, 1 x line-out, 1 x mic	2 x PS/2, 1 x serial, 1 x parallel, 2 x USB, 1 x line-in, 1 x line-out, 1 x mic, 1 x MIDI/games	2 x PS/2, 1 x serial, 1 x parallel, 1 x FireWire, 4 x USB, 1 x RJ45, 1 x line-in, 1 x line-out, 1 x mic	2 x USB, 2 x serial, 1 x parallel, 2 x PS/2, 1 x audio/game, 1 x RJ45	2 x PS/2, 2 x USB, 1 x serial, 1 x parallel, 1 x VGA, 2 x RJ45
ATA/100	ATA/133	ATA/100	ATA/100	ATA/100	ATA/100	ATA/133	ATA/100
2	4	2	3	2	2	2	2
IDE RAID 0, 1, 0+1 / SATA RAID 0, 1	IDE RAID 0, 1, 0+1 / SATA RAID 0, 1	SATA RAID 0, 1	IDE RAID 0, 1, 0+1 / SATA RAID 0, 1	Nil	SATA RAID 0, 1	Nil	SATA RAID 0
ICHSR / SiI3112A	SiI3112	ICHSR	PD020378 / ICHSR	ICH5	ICHSR	ICH5	ICHSR
Broadcom BCM4401/5705/5788 10/100/1000	Intel 82547EI 10/100/1000	Intel 82547EI 10/100/1000	Intel 82562EZ (10/100) / Intel 82547EI (1000)	Optional	Realtek RTL8101L 10/100	Realtek RTL8100B 10/100	2 x Intel 82547EI 10/100/1000
C-Media CM9739A	Realtek ALC655	Realtek ALC650	Analog Devices AD1980/1985	Realtek ALC101	Realtek ALC650	Realtek ALC650	Nil
5.1	5.1	5.1	5.1	stereo	5.1	5.1	N/A
1 x floppy, 2 x rounded IDE, 2 x SATA, 2 x SATA power, 1 x MIDI/games (on bracket), 2 x FireWire (on bracket)	1 x floppy, 2 x ATA/100, 5 x SATA, 1 x SATA power, 2 x FireWire (on bracket), 1 x SPDIF out, 1 x sub/centre speaker, 1 x rear speaker (on bracket), 2 x USB (on bracket)	1 x floppy, 2 x 1 x IDE, 2 x SATA, 2 x SATA power	2 x rounded IDE, 4 x SATA, 2 x SATA power, 2 x SPDIF out (on bracket), 2 x USB (on D-bracket), 3 x FireWire (on bracket)	1 x IDE, 1 x floppy, 1 x SATA, 1 x SATA power, 1 x serial (on bracket)	1 x floppy, 1 x IDE, 1 x SATA, 1 x SATA power	1 x IDE, 1 x floppy, 2 x SATA, 2 x SATA power	1 x floppy, 1 x IDE, 2 x SATA, 1 x serial (on bracket), 4 x USB (on bracket)
278	292	-	-	248	297	302	227
409	421	-	-	408	427	423	300
189	203	183	213	151	207	215	172
30.3	29.9	30.9	29.5	30.1	29.9	29.6	29.5
47.9	50.3	47.6	47.9	48.4	47.2	47.5	44.6
15,045	16,578	16,805	17,334	17,334	14,609	16,457	-
5,428	5,692	5,761	5,957	5,593	5,371	5,746	-
248	287.2	293.7	308.8	308.8	234.8	292.1	-

# WIRELESS &

## INTRODUCING INDUSTRY FIRST 802.11g WIRELESS RANGE



**XtremeG+ 11/54Mbps Wireless LAN PCI Adapter**

- IEEE 802.11b Standard & IEEE 802.11g Draft Specification
- 2.4GHz Frequency Range
- AutoSenses & Adjusts Speed to conditions for Maximum Performance
- 64/128-Bit Wired Equivalent Privacy (WEP) Security Support
- Support for IEEE 802.1x Security



**XtremeG+ 11/54Mbps Wireless LAN PCMCIA Card**

- IEEE 802.11b Standard & IEEE 802.11g Draft Specification
- 2.4GHz Frequency Range
- AutoSenses & Adjusts Speed to conditions for Maximum Performance
- 64/128-Bit Wired Equivalent Privacy (WEP) Security Support
- Support for IEEE 802.1x Security



**XtremeG+ 11/54Mbps Wireless LAN Access Point**

- 10/100Mbps Fast Ethernet Interface for connecting to Wired Network
- IEEE 802.11b Standard & IEEE 802.11g Draft Specification
- AutoSenses & Adjusts Speed to conditions for Maximum Performance
- Support for IEEE 802.1x Security
- 64/128-Bit Wired Equivalent Privacy (WEP) Security Support



**22Mbps Wireless CardBus Adapter**

- Compatible with IEEE 802.11b (DSSS) 2.4GHz Standard. Up to 20% better transfer
- 22Mbps with other AirPlus devices
- 64/128/256 Bit WEP Security
- Built-in Diversity Antenna
- Drivers for Windows 98, 2000, Me, NT & XP



**11/54Mbps Dualband Wireless PCMCIA Adapter**

- IEEE 802.11a (5GHz) and IEEE 802.11b (2.4GHz) Standard
- 72Mbps Turbo Mode IEEE 802.11a
- AutoSenses and adjusts speed to conditions for max performance
- 64/128/152 Bit WEP Security



**AirPlus Ethernet to Wireless LAN Client Adapter**

- 22Mbps Wireless LAN Client Adapter which provides wireless communications for any Ethernet network device
- Suitable for any Ethernet Enabled device, e.g. Network Printers, Scanners, Internet Camera, Game Consoles & Set Top Boxes
- 10Base-T Interface for connecting to Ethernet network device
- Compatible with IEEE 802.11b (DSSS) 2.4GHz Standard



**22Mbps Wireless PCI Adapter**

- Compatible with IEEE 802.11b (DSSS) 2.4GHz Standard
- Up to 20% better transfer with 802.11b
- 22Mbps with other AirPlus devices
- 64/128/256 Bit WEP Security
- Drivers for Windows 98, 2000, Me, NT & NT
- Upgradable antenna



**11/54Mbps Dualband Wireless PCI Adapter**

- IEEE 802.11a (5GHz) and IEEE 802.11b (2.4GHz) Standard
- 72Mbps Turbo Mode IEEE 802.11a
- AutoSenses and adjusts speed to conditions for max performance
- 64/128/152 Bit WEP Security



**22Mbps Wireless Concurrent Access Point & Bridge**

- 4 Port 10/100Mbps built-in switch
- Access Point - AP Client - Bridge (Point-to-Point or Point-to-Multi Point) - Wireless Repeater
- Compatible with IEEE 802.11b standard
- DHCP Server/Client
- Web-based Configuration & Management
- Replaceable Antenna with reverse SMA connector for extending Wireless Range



**22Mbps Wireless Access Point**

- Compatible with IEEE 802.11b (DSSS) 2.4GHz Standard. Up to 20% better transfer
- 22Mbps with other AirPlus devices
- 64/128/256 Bit WEP Security
- Built-in DHCP Server
- Configuration and Management via Web Browser
- External 2.5db Antenna with Reverse SMA Connector



**11/54Mbps Dualband Wireless Access Point**

- Compliant with IEEE 802.11a (5GHz) and IEEE 802.11b (2.4GHz) Standard
- 10/100Mbps Fast Ethernet port for connecting to Wired Network
- AutoSenses and adjusts speed to conditions for max performance
- 64/128/152 Bit WEP Security



**22Mbps Wireless LAN Indoor AP/Bridge**

- Ethernet to 22Mbps Wireless LAN Access Point or Bridge
- Modes of Operation(s): Access Point, AP Client, Bridge (Point-to-Point or Point-to-Multi Point)
- Advanced Enterprise Functions: DCS (Dynamic Channel Selection), AP Group, AP Load Balancing, AP Backup
- Wireless Repeater Operation Function
- Additional LAN Port for AP Backup Function
- Compatible with IEEE 802.11b (DSSS) 2.4GHz Standard
- DHCP Server/Client
- Web-based Configuration & Management
- Replaceable Antenna with reverse SMA connector for extending Wireless Range



# BROADBAND

## INTRODUCING NEW RANGE OF PRODUCT



NEW!

**\$299<sup>95</sup>**  
RRP incl GST  
DSL-302G

### USB/Ethernet Combo ADSL Modem

- Connect single or multiple PC's via USB or Ethernet
- 10BaseT LAN Interface - USB 1.1 Interface
- Supports G.dmt and G.lite
- Built-in PPPoE and PPoA Clients
- Ethernet Bridge Mode
- Configuration & Management via Web Browser
- Telstra Approved



NEW!

22 Mbps

**\$699<sup>95</sup>**  
RRP incl GST  
DSL-604+

### 22Mbps Wireless ADSL Modem/Router/Switch/Access Point

- Connects single or multiple PC's on an Ethernet or Wireless LAN to ADSL
- Built-in 22Mbps Access Point, Router, 10/100Mbps 4 Port Switch, ADSL Modem
- Supports IP Routing, NAT, DHCP
- Configuration & Management via Web Browser, Telnet
- Telstra Approved



NEW!

**\$989<sup>95</sup>**  
RRP incl GST  
DVC-1000

### i2eye® Broadband Video Phone

- Standalone Video Conference Operation (No PC Required)
- 10/100Mbps Fast Ethernet Port for LAN or Broadband Connection
- Video & Audio Out for Television Connection
- Streaming Video at up to 30 Frames/Second
- Adjustable Tilt & Focus Lens
- Built-in Microphone



22 Mbps

**\$399<sup>95</sup>**  
RRP incl GST  
DI-614+

### 22Mbps Wireless IP Router for DSL/Cable Modems with 4-Port 10/100Mbps Switch

- 22Mbps Wireless LAN Access Point
- Compatible with IEEE 802.11b (DSSS) 2.4GHz Standard
- 64/128/256 Bit Wired Equivalent Privacy (WEP) Security Support
- 10Mbps WAN Port for DSL/Cable Modem
- Support NAT for single IP Address & Firewall Protection
- Supports DHCP, VPN, PPP, PAP/CHAP Security
- Advanced Firewall Features
- Configuration & Management via Web Browser



**\$429<sup>95</sup>**  
RRP incl GST  
DI-714P+

### 22Mbps Wireless IP Router for DSL/Cable Modems with Switch and Print Server

- 22Mbps Wireless LAN Access Point
- Compatible with IEEE 802.11b 2.4GHz Standards
- Built-in 4 Port 10/100Mbps Switch, Single Parallel Printer Port
- Supports NAT, DHCP, PPP, VPN, PAP/CHAP Security
- DMZ selectable Port
- Advanced Firewall Features
- Configuration & Management via Web Browser



**\$179<sup>95</sup>**  
RRP incl GST  
DI-704P

### IP Router for DSL/Cable Modems with 4-Port Switch & Single Port Print Server

- 10Mbps Ethernet Port for DSL or Cable Modem connection
- 4-Port 10/100Mbps Switch
- Auto-Negotiation of MDI-II/MDI-X Cross Over for Easy Expansion
- Signal Parallel Port Print Server
- Support NAT for single IP address & Firewall Protection
- Supports DHCP, VPN, PPP, PAP/CHAP Security
- Built-in Telstra BigPond client



**\$335<sup>95</sup>**  
RRP incl GST  
DSL-300+

### Ethernet ADSL Modem

- Connect single or multiple PC's on an Ethernet LAN to an ADSL service
- 10BaseT Interface (RJ45)
- ADSL Interface (RJ11)
- Support G.dmt and G.lite
- PPPoE (RFC 2516) & PPoA (RFC 2364)
- Ethernet Bridge Mode (RFC 1483)
- Built-in PPPoE Client
- Configuration & Management via Web Browser
- Telstra Approved



**\$356<sup>95</sup>**  
RRP incl GST  
DI-804V

### VPN Router for DSL/Cable Modems with 4-Port Switch

- 10Mbps Ethernet Port for DSL or Cable Modem connection
- 4-Port 10/100Mbps Switch
- RS232 Serial Port for backup Analog Modem
- Internal DMZ (Demilitarised Zone)
- LAN-to-LAN VPN Connection (8 Tunnels Supported)
- Stateful Packet inspection (SPI)
- NAT for single IP Address



NEW! 22 Mbps **\$249<sup>95</sup>**  
RRP incl GST  
DI-707P

### IP Router for DSL/Cable Modems with 7-Port Switch & Single Port Print Server

- 10Mbps Ethernet Port for DSL or Cable Modem connection
- 7-Port 10/100Mbps Switch
- Auto-Negotiation of MDI-II/MDI-X Cross Over for Easy Expansion
- Signal Parallel Port Print Server
- Support NAT for single IP address & Firewall Protection
- Supports DHCP, VPN, PPP, PAP/CHAP Security
- Admin via Windows based program, Telnet or Web Browser
- Built-in Telstra BigPond client



**\$449<sup>95</sup>**  
RRP incl GST  
DSL-504

### Ethernet ADSL Modem

- Connect single or multiple PC's on an Ethernet LAN to an ADSL service
- 10BaseT Interface (RJ45), ADSL Interface (RJ11)
- Support G.dmt and G.lite
- PPPoE (RFC 2516) & PPoA (RFC 2364)
- Ethernet Bridge Mode (RFC 1483)
- Built-in PPPoE Client
- Configuration & Management via Web Browser
- Telstra Approved



**\$1,254<sup>95</sup>**  
RRP incl GST  
DFL-500

### Network Secure Firewall with Point-to-Point VPN

- True Firewall suitable for Home or Small Office LAN
- 2 x 10/100Mbps Fast Ethernet Ports for: External LAN Connection (i.e. ADSL or Cable Modem), Internal Connection
- Internal DMZ (Demilitarised Zone)
- LAN to LAN VPN-Stateful Packet Inspection - NAT/DHCP

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Email us at: [sales@dlink.com.au](mailto:sales@dlink.com.au)  
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## It's a hard life

Does your PC have a "standing room only" sign? If so, David Lin may have the answer as he compares six fast, fat ATA hard drives just waiting to be filled.

For years, the most popular PC upgrades have been RAM and hard disks, in that order. Memory is still cheap, and many PC users up-spec their machines from scratch by specifying 512MB to 1GB of RAM — which takes a long time to outgrow.

On the other hand, hard disk space is physical real estate. It's a finite resource always waiting to be filled — and now there are more ways than ever to do so. Video editing, ripping DVDs and music CD collections, broadband downloading. Before you know it, that 40GB hard drive that once looked so vast has become as cramped as Bondi beach on a summer Sunday.

The quick fix solution is to drop in a new hard drive — and from what we've seen in this month's Labs Challenge, there's never been a smarter time to do it. For instance, at \$225 our Editor's Choice, the Samsung SpinPoint SP1604N, boosts storage ceilings to a riotous 160GB. And for those on a budget, Maxtor has 30GB DiamondMax 9 upgrade kits through Dick Smith Powerhouse stores for just \$99.

Having already reviewed the first crop of Serial ATA (SATA) hard disks in APC July (see page 81), this month we've turned our attention to the tried and trusted Parallel ATA (PATA) technology.

The selection centres on 7,200rpm drives with 8MB caches as data buffers between the platters and processors. We also had a 2MB cache drive from Samsung and a 5,400rpm drive from Maxtor.

The "sweet spot" for desktop drives — where manufacturers offer the best price for the greatest capacity — is currently 120 to 160GB.

### How we tested

Each drive was initially tested under HD Tach 2.61 in its raw, unformatted state for random access, read and write throughput. They were then formatted under NTFS and loaded with Windows XP Professional Service Pack 1. We ran WinBench 99 2.0's suite of disk tests: Business Disk WinMark, to measure the transfer rate for short random reads and writes (to simulate normal office productivity applications); and High-End Disk WinMark, to mimic a more complex mix of applications.

Then the drives were partnered with an identical unit and a RAID 0 array was set up, and WinBench was re-run under that config.

The test bench had an Athlon XP 3000+ CPU, Leadtek WinFast K7NCR18D ProII, 2x 256MB Kingston ValueRAM and a Powercolor Radeon 9800 Pro AGP card.

ATA/100, ATA/133, SATA and SATA RAID 0 drives were tested with the Leadtek board's onboard facilities; for PATA RAID we used an Adaptec 1200A IDE RAID card.



## Samsung SpinPoint SP1604N

Samsung may not be a name that springs to mind for hard drives. You're much more likely to think of Maxtor, Seagate and Western Digital. But when APC asked a visiting vice-president from one of the Big Three how he felt about Samsung, his considered response said much

about our Editor's Choice:

"No-one sound underestimates Samsung. It's one to watch."

Samsung's SpinPoint SP1604N has the best performance in this pack, and without a hefty price. Even more amazingly, at 2MB, it has a lower-specced cache than the 8MB drives.

Made up of a pair of 80GB platters, the 160GB SP1604N is both the quietest and coolest drive we tested. It eclipses its nearest competitor, Western Digital's WD1200JB, in the Business Disk WinMark session by a solid 500 WinMark points in the top tier for High-End Disk WinMark and HD Tach.

While the WinBench results drops back to middle of the field in the RAID 0 trials, it delivers the quickest access times and lowest CPU overhead.

It's an astounding set of results for a drive with this price and specs.

We also noted that Samsung's SATA version of this ATA/133 drive, the SP1614C — sharing the same 160GB config but with an 8MB cache — has and equivalent and just as pleasing performance.



Details	
Contact	Westan
Phone	(03) 9543 7733
Online	www.westan.com.au
Price	\$225
Capacity	160GB
HD Tach random access time	13.6ms
Standalone	
WinBench Business Disk WinMark	5K <b>8,890</b> 10K
WinBench High-End Disk WinMark	10K <b>22,300</b> 40K
WinBench CPU Utilization %	0 <b>61.4</b> 100
RAID	
WinBench Business Disk WinMark	5K <b>6,140</b> 10K
WinBench High-End Disk WinMark	10K <b>21,900</b> 40K
WinBench CPU Utilization %	0 <b>85.4</b> 100
✓	Performance; noise level; temperature.
✗	Mid-range RAID 0 scores.
Verdict	●●●●●



## Maxtor DiamondMax 16

While the market clearly favours 7,200rpm drives — with several vendors removing the 5,400rpm models from their line up — others are determined to put a new spin on the older, slower platters. Maxtor's DiamondMax 16 is an example.

In addition to standard sizes from 60GB to 120GB, Maxtor has cooked up a retail kit aimed at the consumer market, and dropped into this a meaty 300GB drive. The result is a \$599 package that's built not for speed but for space, and plenty of it. Making use of all that room isn't without its challenges, however.

The BIOS in many current PCs won't accept a drive of such massive proportions. Even if they do, Windows can't see partitions larger than 137GB when running natively.

It'd be smart disk management to partition a drive as large as this into three or four more slices. But if for some reason you wanted the whole 300GB on tap as a single, spectacularly deep bit bucket, Maxtor's MaxBlast 3 utility can let the operating system see the entire 300GB in a single view.

As Maxtor only submitted a single drive for testing, we couldn't assess the DiamondMax 16's performance under RAID 0.

As a solo drive, performance is surprisingly good, rating well above all of the 7,200rpm competition in Business Disk WinMark and High-End WinMark. But HD Tach random access time is well down on the 13-14ms of in the 7,200rpm drives.

The price of \$599 is hefty for a hard drive, but with 300GB, you're getting plenty for your money.

Details	
Contact	Maxtor
Phone	(02) 9369 3622
Online	www.maxtor.com
Price	\$599
Capacity	300GB
HD Tach random access time	22.3ms
Standalone	
WinBench Business Disk WinMark	5K 10,300
WinBench High-End Disk WinMark	10K 27,600
WinBench CPU Utilisation %	0 85.1
Performance, capacity.	✓
Costly.	✗
Verdict	●●●○

## Maxtor DiamondMax Plus 9

The 120GB DiamondMax Plus 9 ships in 2MB and 8MB cache editions, but with the premium model at \$215 and the lower-specced offering just \$16 cheaper, the 8MB version is an attractive option.

The 8MB unit scores a disappointing 6,180 WinMarks in the Business Disk WinMark test — nearly 2,000 WinMarks below its nearest competitor. Yet in the other single-drive tests, it's quite impressive. HD Tach — which runs across a raw, unpartitioned and unformatted drive — has the DM Plus 9 achieve the lowest random access time and the highest average write throughput.

Comparing this to the 2MB version, it's clear where the larger buffer makes the difference. With the 8MB cache, the maximum write speed under HD Tach is an imposing 64,883MB/s. Averaged across the entire drive, the 2MB cache DM Plus 9 scores less than half what the 8MB drive managed, with 14,933MB/s throughput.

Under RAID 0 this drive is the heaviest hitter in WinBench, with 6,510 and 22,300 WinMarks in Business Disk and High-End Disk tests respectively. Conversely, it has slow access times and 92.4% CPU utilisation.

There is no clear difference in noise, vibration or heat between the two. Both models appear identical, even in labelling, so be careful when ordering.

Details	
Contact	Maxtor
Phone	(02) 9369 3622
Online	www.maxtor.com
Price	\$199 (2MB) and \$215 (8MB)
Capacity	120GB
HD Tach random access time	13.3ms
Standalone	
WinBench Business Disk WinMark	5K 6,180
WinBench High-End Disk WinMark	10K 27,200
WinBench CPU Utilisation %	0 68.2
RAID	
WinBench Business Disk WinMark	5K 6,510
WinBench High-End Disk WinMark	10K 22,300
WinBench CPU Utilisation %	0 92.4
Choice of cache.	✓
High CPU toll.	✗
Verdict	●●●○





## Western Digital WD1200JB

Western Digital's triple-platter 120GB drive scores well in Business Disk WinMark, although under the more demanding High-End Disk WinMark it rates only 19,900 WinMarks while the rest of the 7,200rpm drives pass 20,000.

The WinBench results improve when running a pair of WD1200JBs as a RAID 0 array, but at the cost of a whopping 94.2% CPU overhead — the highest in the roundup.

There are no noticeable issues with noise or heat.

Performance characteristics during benchmarking are remarkably consistent. A perfect example is the way the drive maps a steady throughput under the WinBench tests. These tests produce a graph to show the progress of the disk transfer across the entire span of the drive.

Typically, a drive proves very quick at the beginning of the test, near the platter's centre. As it moves to the outer tracks, the graph dips downwards. A flat-line response shows the drive is just as quick when it's empty to when it's almost full.

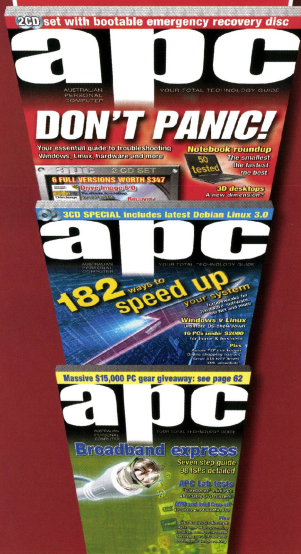
The Western Digital's chart line runs dead straight. Theoretically, this drive should run fast whether it's fresh and only slightly filled, or when it's older and filled to its limits — regardless of the data's location on the platter.

Details	
Contact	Bluechip Infotech
Phone	(02) 8745 8400
Online	www.bluechipit.com.au
Price	\$219
Capacity	120GB
HD Tach random access time	13.5ms
Standalone	
WinBench Business Disk WinMark	5K <b>8,300</b> 10K
WinBench High-End Disk WinMark	10K <b>19,900</b> 40K
WinBench CPU Utilisation %	0 <b>69.8</b> 100
RAID	
WinBench Business Disk WinMark	5K <b>6,360</b> 10K
WinBench High-End Disk WinMark	10K <b>20,300</b> 40K
WinBench CPU Utilisation %	0 <b>94.2</b> 100
✓	Consistent disk transfer rate.
✗	High CPU overhead.
Verdict	●●●○

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A close-up photograph of a woman's face, showing her eyes, nose, and a wide, open-mouthed smile that reveals her teeth. She has a bright, happy expression.

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[illegible]

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# High five

The latest Palm-powered handhelds serve up faster CPUs, brighter screens, built-in cameras, Bluetooth and even Wi-Fi. *David Flynn, Jason Oakley and Jenneth Orantia* round 'em up.

Since the first PalmPilot reshaped the handheld market in 1996, the Palm OS platform's catch-cry has been "less is more". But as Microsoft's Windows-powered PDAs gnaw at the market, Palm has realised it needs to offer a little more than less. Accordingly, Palm has recast the platform, departing from the elegant, if Spartan, simplicity of the original vision.

The latest high-flying handhelds are so different from the Palms of a year ago. Those devices rarely topped 33MHz in CPU speed, most maxed out at 8MB of memory, and the six-year-old OS was a major handicap if the devices were to be more than "connected organisers".

Today's Palm blueprint starts with all-new version 5.0 of the Palm OS, which shifts the platform to meaty ARM processors that out-pace the original Motorola Dragonball chips.

Canny programming allows Palm OS 5.0 handhelds to run most apps written for the 3.x and 4.x operating systems, and at a much faster clip, plus software written with OS 5.0 in mind is several degrees quicker again. The down side is that some of those handy or just-plain-fun "hack" utilities on older Palms will refuse to run and can even cause a system freeze under OS 5.0.

## MIGHTY MITES

The spec sheet for these pumped-up Palms reads more like a Windows handheld: processors clock from 100-400MHz, with up to 64MB of RAM on tap, although OS 5.0 requires that some RAM be roped off for the system. Vendors choose the size of this slice, so check the amount of usable memory in your prospective PDA.

The best Pocket PCs have brighter displays and integrated crowd pleasers such as MP3 players, Bluetooth, Wi-Fi and digital cameras.

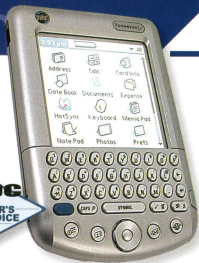
All this trickery takes its toll on battery life. It has always been a strong point of the Palms, and as today's docking cradles double as rechargers, they rarely run dry. If you spend a lot of time away from your home or office, invest in a second charger. Or hunt down a USB combo sync-and-charge cable.

Three of the units examined — Sony's CLIE NX80V and Palm's Tungsten T2 and Tungsten C — employ the new Graffiti 2 handwriting system. It uses a more natural set of characters which is easier for newcomers to learn, but it's a bumpier road for Palm aficionados.

For the Editor's Choice award in this roundup, both the Tungsten T2 and the CLIE NX80V almost claimed it. If either manufacturer had fixed certain shortcomings, they'd have won hands-down.

## How we tested

CPU tests used Speedy 2.6 and each handheld's out-of-the-box configuration. Battery life was measured by running the Down Unda game in a looped demo mode, with the backlight set to two-thirds of the brightest setting with all wireless connectivity disabled.



## Palm Tungsten C

By any measure, the Tungsten C (TC) is Palm's flagship handheld. The Intel 400MHz XScale PXA255 is the same CPU found in the fastest Pocket PCs (and much faster than an equally clocked PXA250 due to the 255's double-speed 200MHz system bus). This jet-propels the unit to 5,556 Speedy points, almost twice as fast as the Sony CLIE NX80V. The battery also leads the pack with a full six hours under test.

Another flagship feature is integrated Wi-Fi, which took only a few taps of the setup wizard screen to hook into our Labs network, as well as a handful of public hotspots (although the range is strictly line-of-sight to each access point). Combined with its VPN tunnelling capabilities, this has immediate appeal for the corporate set.

Only 51MB of memory is available from the 64MB chip, but that's still the most of any Palm-powered handheld, and the TC's software bundle should tempt you.

The company's own VersaMail 2.5 email client allows up to eight POP3 and IMAP accounts, works with Exchange servers and permits incoming and outbound file attachments, which can be stored on an SD memory card to avoid cluttering the main memory.

The Microsoft-compatible Desktop to Go 5.0 handheld office suite is pre-loaded in system ROM to help reduce the RAM cram. Kinoma Producer SE converts and plays MPEG-1, QuickTime and AVI-format video clips on the Palm in full motion.

And globetrotters will appreciate WorldMate, a business-class travel suite with world time clocks, international weather forecasts that update on every HotSync session against The Weather Channel, and conversions for everything from currency (with auto-updating rates) to imperial-metric measurements to clothing sizes.

We found the keyboard surprisingly easy to adjust to, although for anything more than casual pecking you'll need a full-size, fold-out keyboard. Most keys can be shifted into alternative uses by the blue function shifts, and the sticky caps key improves on Sony's implementation — one tap sets it to capitals for the next letter; two taps enables caps lock mode.

For all that, the TC has some disappointments. The headphone socket uses a non-standard 2.5mm jack, and even if you buy an adaptor, the output is monophonic.

Details	
Performance (Speedy 2.6)	0 5,556 10,000
Battery life (hours:mins)	0:00 6:00 12:00
Contact	Palm
Phone	1300 302 959
Online	www.palm.com.au
Price	\$979
✓	Fast CPU; battery life; integrated Wi-Fi.
✗	Mono audio.
Verdict	●●●●●

## Palm Tungsten T2

Palm's Tungsten T2 packs several welcome improvements into its compact sliding chassis. As a result, it's what its predecessor, the T, could have been. If you like the T, you'll love this — just don't go looking for any substantial steps forward in this model's mid-life revamp.

The Tungsten T's 144MHz OMAP1510 engine remains (and is still underclocked from the chip's factory 175MHz spec), making the T2 the slowest of the OS 5 pack, although it runs like it's turbo-charged compared to any pre-S Palm. Yet some clever work under the covers sees the T2 rev slightly higher than the T. The newcomer returns a score of 1,485 under the Speedy CPU test compared to the original model's 1,442. In our battery tests, the T2 manages four hours and 30 minutes of solid use.

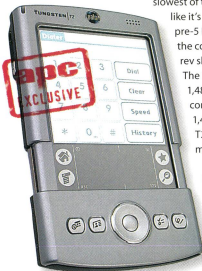
The T2 doubles the T's memory to 32MB, of which 29.5MB is available to the user. Palm's sensible decision to pre-load its Web browser, email, phone dialler and SMS apps into the 8MB ROM chip leaves even more room in

RAM for loading bundled software such as Desktop to Go 5.0, Kinoma Producer SE and VersaMail 2.5.

Also on the overhaul list was the T's reflective display, which has been upgraded to the same vivid transreflective screen as Palm's Zire 71 and the Tungsten C, although here it has a faint blue tinge and is slightly less readable outdoors than the T's dimmer panel. The T's more uniform backlight has been replaced with four tiny lights along the bottom of the screen, similar to some of the Sony CLIE handhelds, and has an annoying dappled effect.

Attributes shared with the T include the built-in Bluetooth module, the slide-down cover concealing the Graffiti input area, a five-way navigation pad for driving the T2 when the cover is shut, the vibrating alert, voice recorder and stereo headphone socket.

The first-gen Tungsten T retails for \$749, but expect prices to drop in coming months as the unit is slowly phased out. This could make the T a smart buy if you don't need the extra RAM or the better screen of the T2.



Details	
Performance (Speedy 2.6)	1,485
Battery life (hours:mins)	4:30
Contact	Palm
Phone	1300 302 959
Online	www.palm.com.au
Price	\$859
Size: Bluetooth; 32MB RAM.	
Slow compared to others in this roundup.	
Verdict	

## Palm Zire 71

The second member of Palm's made-for-mainstream Zire family hits the sweet spot. The speedy 144MHz OMAP1510 processor and crisp transreflective screen are just the start.

The real highlight is the integrated digital camera. Slide the back cover down to uncover the lens and you're ready to shoot. There are three different picture resolutions up to 640 x 480, and it takes surprisingly good images even in low-light conditions. The images can be saved to an SD card — a must-have considering the Zire 71 has only 13.8MB of usable memory on its 16MB chip. And it's stingy of Palm to sell a device like this and trumpet its admittedly cool digital camera, but not even include an 8MB SD card in the box.

Of course, the 0.3 megapixel camera isn't intended as a replacement for a serious megapixel shooter, and it lacks zoom and flash functions. If photography is more central to your handhelding, consider the CLIE NX80V.

On the entertainment side are MP3 and video-clip playback capabilities, using RealOne and Kinoma Player apps (freely downloadable from the Web).

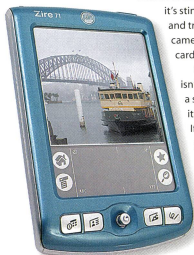
The bright blue-metal chassis reinforces the sporty look consistent with its target market, rather than the Palm's more conservative designs.

Yet the Zire 71 is more than just a pretty face, and it edges ahead of the built-for-business T2 with a Speedy score of 1,563 and a full five hours of battery life.

In the games sphere, the Zire 71's five-way joystick is better built for downtime compared to the navigation buttons of the Tungsten and CLIE devices.

The supplied plastic stylus feels rather cheap (we prefer the Tungsten's metal stylus) and it lacks a reset pin, requiring users to fish around for a paper clip should they need to reset the device.

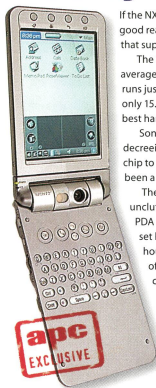
Sound quality is excellent, especially over the stereo headphone jack, and the Zire comes with a set of funky system sounds and alarms not found on the Tungsten series. However, the location of the speaker on the back of the device means the sound is muffled when being held or resting face-up.



Details	
Performance (Speedy 2.6)	1,563
Battery life (hours:mins)	5:00
Contact	Palm
Phone	1300 302 959
Online	www.palm.com.au
Price	\$599
Digital camera; audio and video features.	
Not enough RAM.	
Verdict	



## SONY CLIE NX80V



If the NX80V gives you a feeling of déjà vu, it's with good reason. This is Sony's third trip to the same well that supplies the popular NR70V and NX70V models.

The 200MHz Intel XScale PXA250 powerplant averages 3,050 points on Speedy, and the battery runs just shy of five hours. But of the 32MB of RAM, only 15.5MB is open to the user. That's less than the best handheld under Palm OS 4.0.

Sony's engineers have good reasons for decreasing a 16.5MB system heap, but fitting a 64MB chip to put 48MB into the user's hands would have been a better call.

The NX80V retains the 70 series' clever yet uncluttered clamshell design which divides the PDA into two slim slabs. One bears the keyboard, set back halfway along the surface; the other houses a hi-res transfective 480 x 320 display offering more screen real estate than the Palm's conventional 320 x 320 panel.

The sections are hinged so you can tilt the screen vertically and use the keyboard, just like a regular notebook, or give it a quick twist-and-tilt so it covers the keyboard. In this tablet mode, the only method for entering data is by writing directly onto

the screen. Four hardware buttons atop the panel — for launching the main Palm applets — are a new and welcome touch.

The integrated 1.3 megapixel digital camera has a maximum image size of 1,280 x 960 pixels, and it records MPEG-4 video clips. Instead of a battery-draining flash, Sony has fitted a "capture light" — a small light with a bright white glow. It's adequate for small subjects around a metre from the camera, but useless anywhere else (unless you need a flashlight).

The keyboard is Sony's best yet, with rounded keys providing more room and thus reducing errors compared to the more cramped square keys of other CLIEs.

In addition to the mandatory Memory Stick slot, the NX80V sports a pop-up nook for CompactFlash cards. In the 70V series this works only with Sony's CF-format Wi-Fi card, but the revised model supports CF memory cards.

The CF slot can't be closed while a card is in place, and the bundled Sony software can't see files on a CF card, although several third-party programs can.

Details	
Performance (Speedy 2.6)	0 3,050 6,000
Battery life (hours:mins)	0:00 5:00 6:00
Contact	Sony
Phone	1300 138 246
Online	www.sony.com.au
Price	\$959
✓	Digital camera; CF card support; keyboard.
✗	Only 15.5MB available RAM.
Verdict	●●●●○

## SONY CLIE NZ90



Despite being built to the same blueprint as the 70V family, which spawned the NX80V, Sony's über-PDA is a very different beast to anything from the CLIE stable. Other Sony PDAs are slim, compact and brushed with a silver or aluminium patina, but the big, black, almost brick-like NZ90 is the Darth Vader of handhelds.

The 200MHz Intel XScale PXA250 chip rates a high 2,885 on Speedy, but the model is last across the line in battery testing at three hours and 30 minutes. Use this device to its full muscle-bound potential and you'd better carry a spare. The beefy 1200mAh cell is removable and spares cost about \$200.

However, that full potential is pretty impressive. There's a 2 megapixel camera (1,600 x 1,200 pixels for snapshots, and 160 x 112 for video) kitted out with autofocus, 2x digital zoom, red-eye reduction and flash. The images are as good as you'd expect from any similarly specced consumer digital camera and look brilliant on the 480 x 320 screen.

But, while the camera lenses of the 70V and 80V swivel independent of the screen around almost 360 degrees, the NZ90's lens is attached to the display panel, so you'll need to move the NZ90 around

to frame the shot the way you want. You also have to wait for several seconds between snaps and the flash doesn't work once the battery falls below one-third charge.

Once you've found \$1,500 for the NX80, budget a few hundred more for a high-capacity Memory Stick. The paltry 11MB usable memory from the 16MB RAM is barely enough for any PDA, let alone for saving photos of around 800KB in the highest-quality setting.

A Bluetooth radio is included, although Sony doesn't offer any of the software that Palm packs into the Tungstens. A CompactFlash slot at the foot of the unit accepts Sony's Wi-Fi card, but won't work with any other CF memory card. The odd location of this slot sees the cradle connection shifted to the top-rear of the PDA, where it marries into a cradle that collapses flat for easy transportation.

The cradle has connections for a USB photo printer plus audio/video output, so images or movies can be viewed on any TV.

And for all the NZ90's size, the keyboard is still cramped, with the keys so flush to the surface they need a firm, precise press.

Details	
Performance (Speedy 2.6)	0 2,885 6,000
Battery life (hours:mins)	0:00 3:30 6:00
Contact	Sony
Phone	1300 138 246
Online	www.sony.com.au
Price	\$1,499
✓	Digital camera; replaceable battery.
✗	Size and weight; more expensive.
Verdict	●●●●○



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## Sony CLIE T650

The cheapest of Sony's CLIE Palm OS 5.0 family is a direct competitor to Palm's Tungsten series. But the svelte, eye-catching design and multimedia features make it a better fit for casual Fridays than typical business days and boardrooms.

The 200MHz Intel XScale PXA250 processor hits a Speedy rating of 3,030, more than twice that of the 144MHz. However, there's more to speed than megahertz in real-life usage.

We loaded Cascata's Master Thief game, running the Mobile Wizardry Deity 3D graphics engine. The T2 manages 41.5fps (almost twice the T's 25.6fps, which again indicates that Palm did some CPU tinkering under the hood), against 33fps for the T650. The moral of the story: dig deeper than the spec sheet.

The T650's role as a pocket multimedia machine is reflected in the standard software bundle from Sony. It includes digital audio and video, image players and picture viewers, along with Sony's delightful application launcher.

However, as with the rest of the CLIE family, the bundle of separate software packages is almost overwhelming.

Another family trait is the use of Memory Stick wafers rather than SD cards for off-board storage. And with a meagre 11MB of the 16MB RAM available, you'll almost certainly need to add one of these to your kit. The crisp, transfective panel is marred by dappled patches along the bottom edge of the screen.

Like the Tungsten T series, the T650 has built-in Bluetooth for quick connection to phones and notebook HotSync sessions.

The keyboard keys are too small and close together, and they are too stiff. And because the Shift key isn't sticky, you need to hold it down to type a capital letter or access a function key — an easy task on a full-sized keyboard but not on something as small as this.

Switching over to Graffiti handwriting isn't without its problems, as the onscreen virtual input panel covers half the display and thus half of the application you're using.

The T650 lopes along for four hours and 30 minutes in our continual-use battery tests, which is on a par with Sony's estimate of 11 days at an average 30 minutes a day with the backlight off.

Details	
Performance (Speedy 2.6)	0 3,030 6,000
Battery life (hours:mins)	0:00 4:30 8:00
Contact	Sony
Phone	1300 138 246
Online	www.sony.com.au
Price	\$849
✓	Small, Bluetooth.
✗	Keyboard too small.
Verdict	●●●●○

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The APC team has nominated the best programs in seven categories. It's our "best selection", favourites that stand the test of time, plus little-known gems that deserve a closer look.

You won't find swags of detail on every piece of software under the sun, we're just giving you the stand-outs. And we've bundled as many as possible onto our cover CD set so you can try them for yourself.

Like any list, there's a degree of subjectivity, and other choice pickings must be hiding out there. So when you've done checking our faves and raves, drop a line to [epinions@apcmag.com](mailto:epinions@apcmag.com) and share your selection of must-haves.

### Bonus CD software

We've put some of this great software right at your fingertips, by bundling many of these programs on this month's cover CD set.



#### 90 Utilities

*James Bannan* reviews the latest operating system tweakers and handy tools for day-to-day tasks.

#### 92 Internet

Applications for performing online functions are coming thick and fast. *Jarrod Spiga* wades in.

#### 94 Multimedia

The range of multimedia applications is mind-boggling. *Dan Potts* views the field.

#### 98 Security

Blocking junk while protecting your valuables is a constant battle. *Dan Warne* rounds-up the best.

#### 100 Web development

It's come a long way since the Mosaic browser and a text editor. *Paul Robinson* explores today's tools.

#### 102 Development

*Matt Overington* navigates through the environments, tools and databases of the professionals.

#### 104 Business

*Justin Kranz* sorts out the bulletproof off-the-shelf products for smaller firms.



## Utilities

# Utilicious

There's at least one utility to suit every task, temper and budget. *James Bannan* reviews the latest operating system tweekers and handy tools for day-to-day tasks.

## File & disk management

OS file managers such as Windows Explorer and Linux Nautilus keep files organised, but a couple of utilities enhance the service.

**Nico's Commander** for Windows, with dual windows allowing access to any area of an accessible drive, has shortcut buttons to launch specific applications and more buttons linking to DOS-type file commands (MKDIR, DEL, etc). It has an incorporated hex editor, zip functionality, file/folder synchronisation and FTP site accessibility.

**CompuPic**, a media file manager for Windows, Mac and Linux, allows viewing of images as thumbnails, creates slide shows and sets desktop wallpaper. You can select images for screensavers and use an Internet function to send images as postcards and greeting cards, or simply to email the image. CompuPic links to online image sharing communities, including Photolands.com, and you can upload images to them directly. It can also create Web-ready thumbnails.

## Optimising, diagnostics & system utilities

With most operating systems, diagnostics and optimising don't run much beyond file defragging and clearing temp files. Over a prolonged period of use, even zealous defragging won't prevent your system from dragging its feet.

**Advanced System Optimizer** and **PC Optimizer** are excellent registry maintenance tools that support all versions of Windows. The registry can be a major source of performance problems, and these utilities scan, clean and defrag to remove invalid links and keys, giving it a slicker profile.

Both utilities also have registry backup and restore, and privacy protection (to remove cache files, cookies, temp files for instance). All the maintenance tasks can be scheduled for convenience.

For Macs, **Perfboard** gives a running commentary on a machine's resources: CPU load, active processes, memory pages, network traffic and disk usage. The manual explains these metrics, allowing you to identify bottlenecks and performance problems, and how to address them.

**System Optimizer X** scans and optimises the Mac OS. It updates executable library prebindings, runs clean-up scripts, tweaks network buffer sizes, improves application stability, compresses window buffers and allows CPU prioritising for applications. The tasks can all be scheduled.

Similar to Perfboard, Linux has the OpenGL 3D system monitor **GR\_Monitor** which displays bar graphs about the CPU and memory usage, grouped by each active user.

## Screensavers, icons & wallpaper

We all love those pretty OpenGL savers, but something with our own personal stamp would be better. **!Easy Screensaver Studio** creates custom screensavers in SCR or EXE format. Images can be dragged from Explorer into the project, and various popular music formats can be added. Files within the project can also be set as wallpaper.

**Screensaver Builder Professional** uses images, music, Small Web Format (SWF), video media or Web URLs as content.

For Macs, **iScreensaver Designer** does the same job, creating slideshows from stills

or animated screensavers from QT, AVI, MPEG or Flash files.

And for all the artists out there, **AWIcons** for Windows is the Photoshop of icon creators. It creates icons, cursors and animated GIF cursors up to 128 x 128 resolution. It can import from any existing picture file, supporting multiple formats. Tools and filters cover brightness, blurring, opacity, shadowing and beveling.

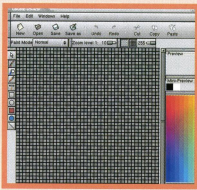
For the Linux fans, there's **Gnome-iconedit** and **Babygimp**. They're less advanced but provide the necessary tools.

## Network monitoring

Every additional resource on a network makes it slightly bigger and more complex, and monitoring tools are needed. For administrators, **Active Network Monitor** for Windows detects locally attached networks and gives a range of options to scan for: workstations, PDCs, BDCs, standalone servers for example. It can also scan for various resources on each detected machine: users, shares, printers, disks and active services, as well as providing ping responses and traceroutes to each device. At a deeper level, it informs on the apps and device drivers on individual machines. Scans can be saved and compared.

**NetProbe** for Windows, Linux and Mac monitors an active local NIC and analyses the traffic passing through. It scans the local network and identifies hosts, protocols and MAC addresses. The monitored statistics are broken down by each metric and can be sorted, re-ordered and exported for analysis.

The reports are viewed via a Web page, which the NetProbe generates using Java applets and publishes locally via port 7030. This enables the utility to be installed on a network server and the results to be viewed remotely. The metrics are not updated in real time but are updated by refreshing the page, and the probe intervals can be set hourly.



▶ **Gnome-iconedit:** easily create desktop icons and cursors for the Gnome interface.





## Internet

### Laying it on the line

With more than 600 million people now using the Internet, applications for performing online functions are coming thick and fast. **Jarrold Spiga** wades in, with an eye for unique features.

#### Communication

With more and more instant messaging networks being established, applications such as **Trillian** allow you to run a single client connecting to multiple networks (including AOL, ICQ, MSN and Yahoo). Trillian is available in a freely downloadable ad-free version, or a professional version with more than 100 enhancements, for US\$25.

The **Jabber** network uses distributed client/server architecture instead of centralised servers. This gives it much greater flexibility, including the ability to create your own closed network — a great feature for office networks. Including transport gateways into the server allows connection to existing instant messaging networks.

A number of free Jabber clients are available but none seems to have the skills of **Rhymbox**, which supports file transfers, invisible mode, SSL and more.

Before instant messaging, Internet Relay Chat (IRC) was the only way to chat online. With thousands of servers making up hundreds of networks around the world, **mIRC** is a Windows-based IRC client that can be everything to everyone. Experienced IRC users will appreciate its high configurability and detailed scripting support. Newcomers to IRC may find it daunting, but there are dozens of newbie guides for getting familiar.



► **Jabber:** perfect for the office, Jabber lets you create your own closed network.

#### File transfer

Since the demise of Napster, P2P networks and applications have taken off in a big way. **eMule** is incredibly easy to use and has nifty features such as download fragmentation, which reconstructs file segments downloaded from many sources.

Some broadband ISPs offer free peer-to-peer traffic, and eMule's IP filtering options allow these users to share files with others who have the same ISP, without worrying about download limits (see APC July, page 126). Another interesting feature about eMule is queue ranking, which gives users who upload the most data higher priority with files on other systems, as opposed to those who predominantly download data.

KaZaA remains a popular P2P network, though Sharman Networks has been accused of including spyware in **KaZaA Media Desktop**. Those with privacy concerns should try **KaZaA Lite**, a cut-down, stable alternative that has KaZaA Media Desktop's core file-sharing functions without the pop-ups.

**BitTorrent** is similar, allowing the simultaneous downloading of files from multiple sources. While it

does force your system to become a "relay" for the files you download, the application has the advantage of being able to run under Windows, Linux and Mac environments.

File Transfer Protocol (FTP) has traditionally been used for transferring files from one host to another. There are hundreds of clients out there — mostly commercial — but some are useful freebies. Commonly used applications such as **CuteFTP** and **FTP Explorer** have just about every function under the sun, but it's hard finding home users willing to pay for them.

**BulletProof FTP** is a little more affordable and has all the useful features of its competitors. Auto-reconnect upon disconnection, quota scheduling, multi-site queuing, cache browsing and clipboard monitoring for example. The one-off cost of US\$30 covers upgrades for life.

While development on **Leech FTP** ceased long ago, many continue to use this client, mainly because its multi-threading capabilities allow the transfer of many files simultaneously. Best of all, it's free.

#### Browsing

More than 90% of Web surfing is done using Microsoft's **Internet Explorer**. Cynics say the dominance is not due to the quality of the software but because the browser is integrated with the Windows shell.

Integration makes browsing faster, but when IE 6 crashes the shell has to be reloaded. Thankfully, its stability is good enough to ensure this doesn't happen often.

While IE is missing some of the features other browsers have, such as Java support (plug-ins can be downloaded from Microsoft or Sun), the core browsing function works well. Another positive is that, due to Windows' monopolistic market share, Web developers use it to test the sites they build, so your pages should be rendered as the developer intended.

On the Mac platform, **Safari** is drastically faster than IE and has feature-rich browsing to boot. Features include tabbed browsing, download manager and pop-up prevention. However, Safari has trouble rendering some pages due to limited support for CSS and iFrames.

**Opera** is arguably the best performing platform-

independent browser, with versions capable of running under Windows, Mac OS, Linux, Unix and others. Size and speed are Opera's main selling points — it's only 3.1MB (without Java). The advertisement-free version can be purchased for US\$39.

**Netscape Navigator** has had a rebirth of sorts since the **Mozilla** engine went open source and became standalone. Both browsers include pop-up controls, tabbed browsing and download managers.

Mozilla is clean, fast, full of features and the best bet for penguin users. User-friendly Navigator sacrifices some speed for eye candy.

## Email

All major Web browsers include email clients. Microsoft's **Outlook Express** is included with Internet Explorer. It's had security holes, however, Microsoft has recently picked up its act regarding this.

Mozilla's **Thunderbird** has additional features such as a skinnable interface, addressing sidebars and extension support.

Both Netscape and Opera also come with mail clients that are compatible with their respective free Webmail services — great for those who want the portability of Webmail with the power of a client-based service.

The Webmail approach is becoming popular. A mail script client such as **Squirrelmail**, on space provided by a hosting company, gives you a more flexible do-it-yourself Webmail solution.

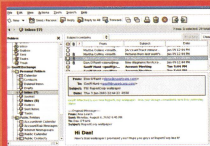
**Pegasus Mail** is a free standalone client with flexible rule-filtering, broad protocol

(including SSL support, extension support and flexible user interface. **Eudora** offers similar features and runs on both Windows and Mac. Eudora is freely downloadable in light or advertisement-sponsored and ad-free modes. If you want full functionality without ads, it will cost you US\$40.

For the small-to-medium enterprise, **Outlook 2002** paired with **Exchange Server** dominates the online collaboration segment. They handle group planning, scheduling, contact management and task assignment features and enterprise email support.

Users running Linux in an Exchange environment should try **Evolution**. The **Ximian Connector for Exchange** allows Evolution to connect to Exchange Servers, bringing online collaboration to the open source market.

Spam-prevention software is becoming



► **Ximian:** the connector for Exchange enables Evolution to connect to Exchange servers.

essential. When we looked at spam stoppers earlier this year (APC May, page 98) **Matador** and **EMC** were the picks of the litter.

Microsoft is developing a spam solution for the upcoming **Outlook 2003**. It'll have auto-update filters, ensuring you always have "the latest" methods to block unwanted messages.

Product	Contact	Online	Price
Internet Explorer 6 SP1	Microsoft	<a href="http://www.microsoft.com/windows/ie/default.asp">www.microsoft.com/windows/ie/default.asp</a>	Free
Opera 7.11	Opera Software	<a href="http://www.opera.com">www.opera.com</a>	Free with advertisements
Netscape 7.1	Netscape Communications	<a href="http://channels.netscape.com/ns/browsers/default.jsp">http://channels.netscape.com/ns/browsers/default.jsp</a>	Free
Mozilla 1.4	The Mozilla Organisation	<a href="http://www.mozilla.org">www.mozilla.org</a>	Free
eMule 0.29c	The Emule Project	<a href="http://www.emule-project.net">www.emule-project.net</a>	Free
BitTorrent	None	<a href="http://bitconjurer.org/BitTorrent">http://bitconjurer.org/BitTorrent</a>	Free
Bulletproof FTP	Digital Candle	<a href="http://www.bpftp.com">www.bpftp.com</a>	US\$29.95 with free upgrades for life
LeechFTP	None	<a href="http://stud.fh-heilbronn.de/~jdebis/leechftp/downloads.html">http://stud.fh-heilbronn.de/~jdebis/leechftp/downloads.html</a>	Free
Outlook 2002	Microsoft	<a href="http://www.microsoft.com/outlook">www.microsoft.com/outlook</a>	\$225, bundled with Office suite
Eudora 5.2	Qualcomm	<a href="http://www.eudora.com">www.eudora.com</a>	Light mode, Free; Sponsored mode, free, w/ ads; Paid mode, US\$39.95
Evolution 1.4	Ximian	<a href="http://www.ximian.com/products/evolution">www.ximian.com/products/evolution</a>	Free.
Squirrelmail 1.4.1	The Squirrelmail Project Team	<a href="http://www.squirrelmail.org">www.squirrelmail.org</a>	Free
Pegasus Mail	None	<a href="http://www.pmail.com">www.pmail.com</a>	Free
Matador	MailFrontier	<a href="http://www.mailfrontier.com/products_matador.html">www.mailfrontier.com/products_matador.html</a>	US\$29.95
Trillian	Cerulean Studios	<a href="http://www.ceruleanstudios.com">www.ceruleanstudios.com</a>	Trillian v0.74, free; Trillian Pro v1.0, US\$25
Rhymbox	Rhymbox LLC	<a href="http://www.rhymbox.com">www.rhymbox.com</a>	Free
mIRC 6.03	mIRC Co.Ltd	<a href="http://www.mirc.co.uk">www.mirc.co.uk</a>	Free 30-day trial, US\$20 to register
Agent 1.93	Forte	<a href="http://www.forteinc.com">www.forteinc.com</a>	Free Agent (Light), free; Agent, US\$29

## News

Usenet is another basic Internet service which has proven handy for many purposes over the years. Some email clients, such as **Outlook Express**, have newsgroup browsing features, though anyone wanting to uncover the treasures that newsgroups contain will prefer a reader with full functionality.

One such application, **Agent**, is available in two forms. **Free Agent** does not support yEnc (a binary coding scheme for encrypting and compressing many executables and image data), lacks customising, and has limited search and sorting features. The full version, with these features added and including a simple email client, costs US\$29.

About the only thing missing from Agent is an internal picture viewer, although this is set to be introduced in an upcoming version.



# Multimedia

## Multi choices

The range of multimedia applications is mind-boggling, and distinctions between them are blurring as Web apps cross over into video, and video into audio. *Dan Potts* views the field.

### Web

**Macromedia's Flash MX** for Mac and Windows integrates easily with the company's other Web development products, **Dreamweaver** and **FireWorks**. Since the Flash file format began, a host of other applications have been released to make Flash animations without the skills or cost required for the original. For 3D animation, **Swift 3D** imports 3D file formats for use in Flash animations.

**LiveMotion**, Adobe's answer to Flash MX, integrates with **Photoshop**, **GoLive** and **Illustrator** as an alternative to the Macromedia range.

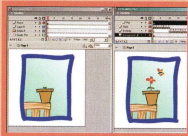
For creating sophisticated animations or interactive content, the choice comes down to Flash MX or LiveMotion. Programmers may prefer Flash MX for its superior scripting environment, although LiveMotion supports both ActionScript and JavaScript.

For the rest of us, it's a matter of weighing up Flash MX's superior video handling and simple interactivity features (such as pre-built buttons and scripts) against LiveMotion's focus on design tools — an area Flash has often been criticised for.

**SWISH** has simple animation tools to enhance regular HTML-based sites. It uses a streamlined interface, but with predefined animation templates you can drag into place. While everything in SWISH can be achieved with Flash MX or LiveMotion, it takes a fraction of the time, making SWISH a complementary program rather than a replacement.

Apple's **QuickTime** is one the longest-standing Web video formats, surviving against the odds to take on Microsoft's **Windows Media** format. Besides its cross-platform nature, QuickTime supports interactive elements such as clickable hotspots, drag-and-drop motion and JavaScript control. Add all this up and you have not just a basic video format, but a versatile multimedia authoring environment.

For a complete authoring app, try Macromedia **Director**, though the learning curve is as steep as the list of its features. For authoring with QuickTime, there's **Fluition** (Mac) and **EzediaQTI** (Mac and Windows) for interactive presentations, while **VRToolBox The Work** (Mac) is good for VR authoring.



▶ **Flash MX:** has a superior integration and an excellent scripting environment.

### Video

**Players:** There is some crossover with audio and video players — almost all the players already mentioned support video formats. Additionally, some media players are designed specifically for video playback.

**The Player**, which comes with the DivX 5 distribution, is worthy of mention. It's tailored to play videos encoded with DivX compression in maximum quality, and it supports virtually all other video formats as well.

More common are specialised DVD players such as **PowerDVD** and **WinDVD**. Both support a vast array of playback options including subtitles, widescreen, 24bit 96K audio, Dolby, DTS and SRS surround, bookmarks, skins, digital zoom and screen capture. With similar prices, it's a matter of personal choice — the best skin wins.

**Editors:** Sonic Foundry's **Vegas Video** has won many prizes over old-school video editing apps such as Adobe **Premiere** and Ulead **Media Studio Pro**. In most cases it's the intuitive interface, real-time previewing and price that swing the decision. Vegas is very hard to fault, and coming bundled with Sonic Foundry's DVD option, it's an affordable and complete video authoring package.

Premiere has hardcore fans, but this is arguably due to its high-end, real-time video systems.

Ulead seems to be struggling to stay with such strong competition, although Media Studio Pro has evolved in leaps and bounds since Vegas hit the scene. Version 7 has direct support of dual-head video cards, alternative DV codec support, direct-to-MPEG capture, and integrated DVD authoring — none of which the competition can match.

### Utilities

**Encoders, decoders and processors:** As programs such as SWISH demonstrate, there are situations where specialised utilities can perform repetitive or simple tasks much more efficiently than its "professional" counterparts. Into this category fall batch processors such as Sonic Foundry's **Batch Processor Pro** (BPP) Canopus' **ProCoder** and the widely acclaimed freeware utility **VirtualDub**. The first two apps are designed to convert media files from one format to another with minimal user input.

ProCoder costs almost five times as much as

BPP, with almost no obvious benefits for casual users aside from its GUI and Mac availability.

**VirtualDub** and its hacked cousin, **VirtualDubMod**, are capable of almost everything ProCoder and Batch Converter can do, and each weighs in at well under a megabyte. Plus they're free.

They have a collection of custom processing filters such as colour adjustment, resizing and filter effects. Additionally, they include a simple batch processor with scripting language. There are even utilities available for making

VirtualDub batching that much easier.

**DVD backup utilities:** Another fast-growing field. Possibly the best is **DVDx 2.2** for Windows. It decodes DVD files with the selected audio track and subtitles to a single video file on your hard drive in the format of your choosing. A entire DVD can be backed up to a single CD-ROM using the DivX codec.

The new DVD Ripper **Dr DivX** backs up DVDs and captures directly from videotape or TV for conversion to DivX.

Mac users should check out **EasyDivX**

## Audio

**Players:** With talk about software MP3 players, nine times out of ten **Winamp** is the first name mentioned. Winamp 2 has been the yardstick for years (Winamp 3 failed to live up to it though).

Of course, Microsoft would like you to associate **Windows Media Player** (WMP) with MP3 and media files in general. Alas, the things that were resented about Real Player — ubiquitous advertising, fascistic control over your desktop — have been incorporated into WMP, albeit much more discreetly.

So what happened to Winamp? It seems Nullsoft tried to incorporate too much into the new version, making it unstable, resource-hungry and bloated — with so little to gain. In contrast, smaller applications such as **BSPlayer** and **Zoom Player** have entered the field with lean, fast and reliable code.

Similarly lean media players are available for Linux, one of the best being **XMMS**, essentially a Winamp clone.

On the Mac front, **MP3Rage** is a popular player encompassing a broad range of MP3 utilities such as cataloguing, searching, sorting, tag editing and CD burning.

DJs can check out **Traktor DJ** and **AtomixMP3**, which allow beat-mixing of two MP3 files or playlists with a virtual turntable set up, complete with cross-fader and pitch control.

Linux users should also investigate **Final Scratch**, incorporating actual turntables into MP3 mixing.

**Editors:** A variety of editors are available to trim and clean MP3 files, create soundtracks for presentations or video, and create telephone answering machine messages.

In the Windows audio scene, **CoolEdit Pro** is still at version 2 after nearly 10 years — testifying to its feature list. Surprisingly, you get a complete range of audio utilities including MP3 support, multitracking, DirectX plug-in support and CD burning.

At the top end of the spectrum are Sonic Foundry's **SoundForge**, now at version 6, and Steinberg's **Wavelab 4**. Intended for professional use, the advanced features would rarely if ever be used even by most pros.

Ordinary consumers can try the freeware **Audacity** and basic **GoldWAV**. Audacity performs all the most common audio editing tasks such as recording, copy and paste, level adjustment, fades, normalisation and equalisation. Available for Windows, Linux and Mac, it's the only truly cross-platform editor.

for backing up video (not to be confused with the equally good software for Windows with the same name).

**Organising and cataloguing:** With the ever-growing range of audio and video files spread across hard drives, CDs and DVDs, it can be a nightmare trying to browse or search for misplaced media. But the software solutions are many.

Long-serving **Iview MediaPro** for Windows and Mac OS helps categorise, rename, organise, convert, print and save media files to Web pages. It can create also slide shows.

A similar program for Windows is **ACDSee**. Like MediaPro, it imports images from scanners and digital cameras without an intermediate process.

Product	Contact	Online	Price
Dreamweaver MX	Macromedia	<a href="http://www.macromedia.com/ap">www.macromedia.com/ap</a>	\$827.20
Fireworks MX	Macromedia	<a href="http://www.macromedia.com/ap">www.macromedia.com/ap</a>	\$620.40
Flash MX	Macromedia	<a href="http://www.macromedia.com/ap">www.macromedia.com/ap</a>	\$1,034
Fluition	Confluent	<a href="http://www.fluition.com">www.fluition.com</a>	\$212
GoLive	Adobe	<a href="http://www.adobe.com.au">www.adobe.com.au</a>	\$825
Illustrator 10	Adobe	<a href="http://www.adobe.com.au">www.adobe.com.au</a>	\$880
LiveMotion 2	Adobe	<a href="http://www.adobe.com.au">www.adobe.com.au</a>	\$872
Photoshop 7	Adobe	<a href="http://www.adobe.com.au">www.adobe.com.au</a>	\$1,329
QuickTime 6	Apple	<a href="http://www.quicktime.com">www.quicktime.com</a>	US\$30
Swift 3D 3	Electric Rain	<a href="http://www.swift3d.com">www.swift3d.com</a>	US\$169
SWISH 2	SwishZone	<a href="http://www.swishzone.com">www.swishzone.com</a>	US\$50
The Work 2.0	VRToolbox	<a href="http://www.vrtoolbox.com">www.vrtoolbox.com</a>	US\$300
AtomixMP3	AtomixMP3	<a href="http://www.atomixMP3.com">www.atomixMP3.com</a>	Free
Audacity 1	Audacity	<a href="http://audacity.sourceforge.net">http://audacity.sourceforge.net</a>	Free
BS Player	BSPlayer	<a href="http://www.bsplayer.org">www.bsplayer.org</a>	Free
Cool Edit Pro 2	Syntrillium	<a href="http://www.cooledit.com">www.cooledit.com</a>	US\$249
Final Scratch	Final Scratch	<a href="http://www.finalscratch.com">www.finalscratch.com</a>	US\$595
MP3Rage	Chaotic Software	<a href="http://www.chaoticsoftware.com/ProductPages/MP3Rage.html">www.chaoticsoftware.com/ProductPages/MP3Rage.html</a>	US\$25
SoundForge 6	Sonic Foundry	<a href="http://sonicfoundry.com">http://sonicfoundry.com</a>	US\$400
Traktor DJ	Native Instruments	<a href="http://www.nativeinstruments.com">www.nativeinstruments.com</a>	US\$60
Wavelab 4	Steinberg	<a href="http://www.steinberg.net">www.steinberg.net</a>	US\$600
Winamp 2	Nullsoft	<a href="http://www.winamp.com">www.winamp.com</a>	Free
Winamp 3	Nullsoft	<a href="http://www.winamp.com">www.winamp.com</a>	Free
Windows Media Player 9	Microsoft	<a href="http://www.windowsmedia.com">www.windowsmedia.com</a>	Free
XMMS	XMMS	<a href="http://www.xmms.org">www.xmms.org</a>	Free
Zoom Player Standard	InMatrix	<a href="http://www.inmatrix.com">www.inmatrix.com</a>	Free
Media Studio Pro 7	Ulead	<a href="http://www.ulead.com">www.ulead.com</a>	\$1,180
PowerDVD 5	CyberLink	<a href="http://www.gocylberlink.com">www.gocylberlink.com</a>	US\$50/\$100
Premiere 6	Adobe	<a href="http://www.adobe.com.au">www.adobe.com.au</a>	\$1,136
The Playa 2.1	DivX	<a href="http://divx.com">divx.com</a>	Free with DivX 5 (or US\$20)
Vegas Video 4	Sonic Foundry	<a href="http://sonicfoundry.com">http://sonicfoundry.com</a>	\$799
WinDVD 5	InterVideo	<a href="http://www.intervideo.com">www.intervideo.com</a>	US\$50/\$100
ACDSee 5	ACDSee	<a href="http://www.acdsystems.com">www.acdsystems.com</a>	US\$50
Batch Converter 5	Sonic Foundry	<a href="http://sonicfoundry.com">http://sonicfoundry.com</a>	US\$150
Dr DivX 1.02	DivX	<a href="http://www.divx.com/divx/drdivx">www.divx.com/divx/drdivx</a>	US\$50
DVDx 2.2	LabDV	<a href="http://www.labdv.com/dvdx">www.labdv.com/dvdx</a>	Free
EasyDivX	Abyss	<a href="http://www.enseirb.fr/~robert/abysssoft/news">www.enseirb.fr/~robert/abysssoft/news</a>	Free
Media Pro 1.57	Iview	<a href="http://www.iview-multimedia.com">www.iview-multimedia.com</a>	US\$90
ProCoder	Canopus	<a href="http://www.canopus.com">www.canopus.com</a>	\$1,499
VirtualDub 1.54	VirtualDub	<a href="http://virtualdub.org">http://virtualdub.org</a>	Free



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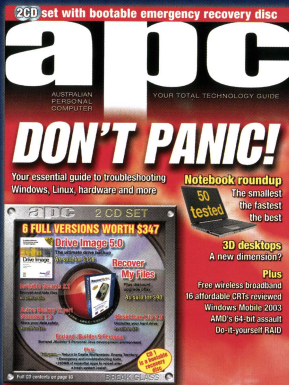
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## Security

### The defence department

Blocking unwanted junk while protecting your valuables is a constant battle. **Dan Warne** rounds up the best security programs for firewalling, fighting viruses, encryption, spyware and parental control.

#### Encryption

A little-known feature of Windows is the **Encrypted File System (EFS)** in Windows 2000 and XP. As long as you're running the NTFS file system, encrypting files and folders (but not whole disks) is easy (see Workshop on page 126 for more). However, EFS has been cracked and shareware tools are freely available to decrypt it.

Microsoft has offered integrated message encryption since **Outlook 98**, and even **Outlook Express 4** and above, though it's never been promoted. It's that enigmatic Security tab in Options. To get started, you'll need an X.509 personal digital certificate, which you can get free from a provider such as Thawte, and then choose that certificate for encryption in Outlook.

Both the sender and receiver need to have each other's digital certificates, and need S/MIME-compatible email clients. Although these are prevalent in the Windows world, due to Microsoft's support of the standard, they are less so among Mac and Linux users (although the Mozilla's email client does support S/MIME).

**PGP**: the best-known brand in encryption, recently copped some flack from users when it crippled the freeware version of its product, removing integration with popular email programs. For version 8 onwards, it costs US\$50 to have email integration and the ability to encrypt files and folders.

Nonetheless, the freeware product is still easy to use, with a key-generation tool that avoids the delay in obtaining a digital certificate used for S/MIME encryption. A straightforward email encryption tool does a good job if you're prepared to cut-and-paste.

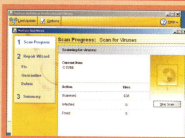
Australian-made **EncryptNT** offers transparent disk partition encryption with features including the ability to encrypt CDs and other removable media. Individual users

#### Antivirus

Viruses ain't viruses any more, as viruses and worms blur the edges between hacking and infecting. Taking a "multi-exploit" approach is now common, with virus writers attacking on many fronts at once.

If you have a reasonably fast computer, Symantec's **Norton AntiVirus 2003** is a solid package for both Windows and Mac OS X, with automatic updating, email interception and scanning, and script blocking. It's unobtrusive and the user interface is designed well, making it easy for inexperienced users to navigate through virus scanning and disinfection.

For straightforward, no-gimmicks virus protection, Australian-made **VET Anti-Virus** is excellent. It doesn't have some of the more elaborate features of the Norton package, such as mail interception and scanning, but it does intercept viruses when they try to load



**Norton AntiVirus 2003**: Its intuitive interface makes virus scanning and disinfection easy for beginners.

themselves into memory. VET is resource-efficient and as snappy running on a Pentium 233 as on a 3GHz powerplant. Silent automatic updating is implemented well. A nice bonus is that VET customers get a free licence for VET for Palm OS.

**Chkrootkit** is an invaluable script for Linux that checks system files for the presence of root kits (similar to trojans).

The super-spyware nasties are usually slipped into the system by a cracker exploiting the "vulnerability of the month", and sit disguised as system files. They're particularly powerful because they can disguise themselves by modifying the system not to show their files, network connections or processes.

Chkrootkit automates the relatively complex tests needed to detect a root kit, such as checking if any network interface is in promiscuous mode, and if external processes are modifying system logs.

#### Parental control

Effective parental control is tricky, with P2P file-sharing programs, instant messaging, IRC chat and spam emails potentially exposing kids to offensive content.

None of the parental control products APC looked at had content-filtering across all the necessary net applications and protocols. However, **Norton Internet Security** finds a good balance between cost and coverage. It includes a Web-content filter based on regularly maintained blacklists, spam protection, virus protection and a firewall.

on a PC can be set up with different security levels, such as restricted access to floppy and CD drives. The ability to provide a virtual hard drive on a server (actually an encrypted file) is useful.

EncryptNT's main selling point is that it has "absolutely no back door", unlike Windows'

It also offers flexibility, allowing administrators to set different levels of content filtering for each user on a computer.

For Linux or Mac, **DansGuardian** filters content using a wide range of technical methods. Like most open source software, considerable configuration is required. You'll need to set up the Oups or Squid proxy that runs with DansGuardian. However RPMs are available for a number of Linux flavours, and there's also a Mac OS X installer with Squid and DansGuardian pre-configured.

built-in encryption. If you lose your keys, you lose your data — but that's a comfort for people who really want privacy.

Installation is lengthy, requiring multiple reboots and configuration of user accounts. We would have liked to have seen a setup wizard, but the documentation was adequate.

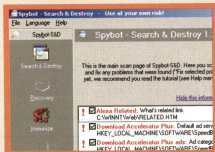
## Spyware control

If adult links or click4dough are hindering your Web browsing, some adware/spyware has probably hitched a ride on your computer. Since most spyware relies on Microsoft vulnerabilities, the most effective way to guard against it is to dump IE for an alternative browser such as **Mozilla**, and swap Outlook Express for a non-Microsoft email app.

If you're not keen on that, regularly scan your PC with multiple spyware detection programs. No single program picks up all types of spyware, and some are better than others at detecting and eradicating different types.

**AdAware** is a killer spyware scanner. It detects a huge range of spyware and adware, scans fast and quarantines or deletes dubious files. It also detects cookies from advertising sites that can be used to track your Net usage.

However, AdAware's makers have been slow to release updates, with some months between new signature file releases.



► **SpyBot**: removes adware, spyware, keyloggers, usage tracks, trojans and other baddies.

**SpyBot Search & Destroy** is another popular scanner, with the edge over AdAware in one area: inoculating computer against ActiveX-based infections. Users are often duped into accepting an ActiveX Web-page control, thinking it will offer a browser enhancement or novelty desktop accessory. Microsoft provides a vague warning

dialogue box when a Web site tries to load an ActiveX control, but many people don't realise that by clicking Yes, they're giving the Web site owner almost full control of their computer.

## Firewalls

There's no shortage of vendors offering excellent, and free, firewalls for Windows that are easy to set up and use. But their endless pop-ups about how to handle network traffic demand caution. Become overly generous with clicking Accept and you'll end up with a firewall like Swiss cheese.

A recently discovered security hole in the free version of **ZoneAlarm** allows trojans to send virtually any information to the Net (such as your username and password) by embedding it in a Web URL. Users sniffed a rat when the company urged them to upgrade from the free ZoneAlarm to the paid Pro version (see our review on page 52) which didn't suffer the vulnerability. Zone Labs says it will release a patch.

ZoneAlarm also over-simplifies the creation of firewall rules, so it's not always obvious what you are actually permitting or denying. You can grant programs "server rights", but it's not clear what that means. For proper operation, some instant-messaging apps should be given server rights in ZoneAlarm. **Kerio Personal Firewall** offers a clean, no-fuss interface that uses minimal resources. It runs well on slower computers and gives the information needed to set up a firewall in an informed way. For example, the list of connections to/from your computer would be handy for troubleshooting a program connection problem. You'd be able to see the connections it's trying to make, and why the firewall is rejecting them.

Both Mac OS X and Linux include industrial-strength Unix-based firewalls and either can either choose the firewall config tools that ship with their distributions or a shareware tool.

Our favourites, Brickhouse for Mac OS X and Firestarter for Linux, have wizards to guide you through set up, and good logging and monitoring windows to track what's happening and spotting firewall problems. Both packages also automate setting up IP sharing.

Product	Contact	Online	Price
ZoneAlarm 3.7.193	Manacomm	www.zonealarm.com	Free
Kerio Personal Firewall 2.1.5	Infotronics	www.kerio.com.au	Free for personal use, \$67 for business
Brickhouse 1.b6	Brian Hill	personalpages.tds.net/~brian_hill	Shareware US\$25
Firestarter 0.9.2	Tomas Junnonen	http://firestarter.sourceforge.net	Free
Norton AntiVirus 2003	Symantec	www.symantec.com.au	\$110
VET Anti-Virus 10.59	Computer Associates	www.vet.com.au	\$85
Sophos Anti-Virus 3.71	Sophos	www.sophos.com.au	\$269 for single-user (with deep-volume discounts)
Norton AntiVirus 9.0 for Macintosh	Symantec	www.symantec.com.au	\$130
Chkrootkit 0.41	Nelson Murilo	www.chkrootkit.org	Free
PGP Personal	PGP Corporation	www.pgp.com	US\$50
EncryptNT 2.0	Elantra	www.elantra.com.au	\$200
Eraser 5.6	Heidi Computers	www.heidi.ie	Donateware
SafeShred Free 2.1.7 (Mac OS X)	CodeTek Studios	www.codetek.com	Free
AdAware 6	Lavasoft	www.lavasoft.de	Free
Spybot Search & Destroy 1.2	PepiMIK Software	http://security.kolla.de	Donateware
Norton Internet Security 2003 6.02	Symantec	www.symantec.com.au	\$150
DansGuardian 2.6.1	Daniel Barron	http://dansguardian.org	Freeware (US\$5 a month for blacklist updates)
DansGuardian with Squid for OS X 1.0	OSXGnu	www.osxgnu.org	Freeware (US\$5 a month for blacklist updates)



# Web development

## Raising your sites

Web development has come a long way since the days of a Mosaic browser and a text editor. *Paul Robinson* looks at today's smart tools.

### Full suites

Adobe's **GoLive 6** Web development environment integrates with Photoshop and now supports Photoshop (PSD) and Illustrator files. Images can be resized from within GoLive 6 so there's no need to waste time continually swapping between Photoshop and the Web development environment.

**LiveMotion 2**, included with GoLive, is a convenient alternative to Flash. It supports ActionScript as well as JavaScript and, like GoLive, it integrates well with other Adobe products. Adobe **AfterEffects** can be used for more complex animations that can be imported into LiveMotion.

By including the **Web Workgroup Server**, Adobe has ensured that buying third-party control software is no longer necessary. The server supports any WebDAV applications, such as Photoshop and Dreamweaver. GoLive 6 supports common scripting languages including PHP, ASP and JSP, which makes linking Web designs to back-end databases simpler for developers without a programming background.

GoLive has a JavaScript text editor for an editing environment, but lacks any real debugging capabilities.

The price is a bit steep, but Adobe-only companies may be willing to pay the extra for an integrated Web development application.

Macromedia **Dreamweaver MX** has long been the mainstay of Web development. Through steady upgrades, it's provided increasing functionality to improve developer/designer productivity.

Dreamweaver can help write code for all the popular server-side technologies, such as ASP, ASP.NET, PHP, JavaServer Pages, ColdFusion and JRun. Dynamic content can be tested using a local server or live over the Net.

Dreamweaver's user interface is similar to the rest of the MX series, with easy access to object properties, layout tools and scripting reference guides.

If all this isn't enough to sway you, consider

the price. It's cheaper than similar products such as **FrontPage** and GoLive while offering far more flexibility.

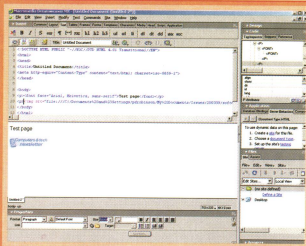
Macromedia **ColdFusion MX**, created in the heyday of the dot com boom, was designed to offer similar functionality to Microsoft's ASP technology by allowing developers to create data-driven or dynamic sites easily using a point-and-click WYSIWYG interface.

**ColdFusion MX Developer Edition** acts as a limited version of the ColdFusion MX server. By running Developer Edition on your workstation, you can test ColdFusion pages locally rather than having to upload them to a live server. As this is essentially a server, a text editor similar to the ones mentioned below or a copy of Dreamweaver must be used to create the ColdFusion pages. By saving the pages to the Web root directory, they can then be tested with the cut-down server.

ColdFusion is compatible with XML and is Java-verified for portability to J2EE servers, further extending its capabilities.

**Contribute 2.0** (see our review on page 60) also available for the Mac, is Macromedia's solution for the growing market of people who need to update content on a site but don't necessarily need to change the site's framework. Creating a site from scratch in Contribute is painful; it was designed to complement sites created in Dreamweaver.

This arrangement is perfect for companies that want Web developers to do what they're meant to — develop Web sites and applications, rather than continually updating content. By using Dreamweaver templates, the content editor is restricted to certain areas



► **Dreamweaver MX:** it can help write code for all the popular server-side technologies and test dynamic content on a local server or live over the Net.

of the page. Styles are enforced to make the changes look as professional as the original.

One of Contribute's strongest features is that it can import just about any document, be it an Office file or Acrobat document, and convert it to FlashPaper. And as it's vector-based, the space (and therefore bandwidth) savings are quite impressive.

Unfortunately, Macromedia has introduced product activation. Be prepared to add one more to the list of companies to call as part of a tedious reinstallation process, should your machine ever need reinstalling.

Microsoft **FrontPage 2002** has for most of its existence been the target of jokes. Perceived as a Clayton's editor, it was renowned for creating bloated HTML that would often work only in IE browsers. While the 2003 version promises a swag of new features — some similar to Dreamweaver and others from Microsoft's Visual Studio Development platform — we're stuck with 2002 for now.

FrontPage's key benefit is that it allows novices to add a lot of functionality to their sites with a few clicks. Users can easily create photo galleries, discussion boards and online surveys, to name a few. An invaluable tool for less-experienced developers.

## Construction tools

Although not primarily a Web development tool, Borland **JBuilder 9** can create sites based on Java technology, either as Java applets or J2EE server side scripts called Java servlets. There's no HTML validation or colour-coding as this is an application development platform.

JBuilder provides a rich visual interface in which to code, and an integrated development environment (IDE).

It's overkill for many developers, but a lot of commercial sites are being created using J2EE technology. This is due to its OS independence and history as a robust, although not always fast, technology that handles system resources efficiently and doesn't cause memory leaks.

JBuilder's main benefit is that it increases code cutters' productivity by assisting where possible. Applet windows can be set out on screen instead of hand-coding dimensions and positions, and a time-saving feature with a pick list of object properties and functions that save you from looking up the function list in a separate window or API documentation.

Microsoft's application development environment, **Visual Studio.NET**, has the same degree of support for creating Web content as JBuilder. It's not a Web development tool per-se, but it provides the best environment for creating .NET-powered Web sites.

Whereas previous Microsoft programming languages generated pure machine code to be executed directly by a microprocessor, the .NET family of languages generates the intermediate binary language Microsoft

Intermediate Language (MSIL).

.NET is rather expensive to license and often tricky to configure. However, if the .NET framework is the best choice for your solution, then Visual Studio is invaluable for rapidly creating applications, online or otherwise.

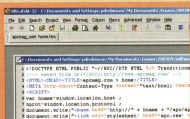
When developing sites, you want them to be correctly viewed on as many browsers as possible. The best way is to ensure the HTML code is standards-compliant. **HTML Validator** from CSE is able to check both HTML and CSS code for syntactical correctness, it grades the mistakes depending on the severity of the problem. Errors are most likely to cause issues in many browsers, whereas warnings indicate that a particular browser may have difficulty with some aspect of a page, such as a non-URL-encoded string with spaces.

Comments are the lowest warning level and usually include missing meta tags for certain Web standards and spelling mistakes.

HTML Validator can also be a text-based HTML editor thanks to its many inbuilt editing features, such as the tag-insertion toolbar.

XML has matured from something people stared at with curiosity to an industry standard in Web development. **XMLSPY** provides an excellent IDE for XML development. Schemas can be created intuitively using the visual schema and DTD editor. It also provides the ability to edit and debug XSLs along with XML.

Database import functionality provides easy access to importing



► **UltraEdit-32 v10:** this colour codes many languages and has a powerful new search engine that includes being able to use regular expressions.

data from ADO data sources such as SQL Server 2000 and Oracle 9i.

Many developers who cut code for multiple programming or scripting languages choose solution-specific text editors when necessary. Arguably the best Windows-based text editor is **UltraEdit-32 v10** due to its large number of supported languages and ability to be configured for any language not supported at its release.

As well as colour coding for numerous popular languages, UltraEdit has powerful search functions such as the ability to use regular expressions. There's auto-completion for commonly used words in your previous text, hex editor functionality, a function list for quick navigation and remote editing via FTP or SFTP.

Equally good text editors are **BBedit** for other operating systems, such as **BBedit** for the Mac and **Bluefish** for Linux.

## Flash news

Flash clips are everywhere you look on the Web — often in annoying advertisements layered on top of the page you're viewing. Originally a simple way of providing a multimedia experience, with sound and animation, Flash has grown with the development of its own scripting language, **FlashScript**, and subsequent functionality enhancements.

Communication capabilities have improved in leaps and bounds as well. Flash can now be integrated with any XML-driven site, Web services, databases and application servers. Support for media formats has improved with the inclusion of many standard video formats, such as QuickTime.

Complex applications can be built in Flash, and one of its more popular uses is game creation.

A key benefit is its platform independence, with Flash clips looking identical on any supported operating system or browser. For this reason, more sites are switching to Flash to reduce development headaches and enhance their visuals with its animation capabilities.

Product	Contact	Online	Price
GoLive 6.0	Adobe	<a href="http://www.pacific.adobe.com">www.pacific.adobe.com</a>	\$999
Dreamweaver MX	Macromedia	<a href="http://www.macromedia.com/ap">www.macromedia.com/ap</a>	\$869
ColdFusion MX Server	Macromedia	<a href="http://www.macromedia.com/ap">www.macromedia.com/ap</a>	\$1,699
Contribute 2.0	Macromedia	<a href="http://www.macromedia.com/ap">www.macromedia.com/ap</a>	\$226
FrontPage 2002	Microsoft	<a href="http://www.microsoft.com.au">www.microsoft.com.au</a>	\$237
JBuilder 9 Developer	Borland	<a href="http://www.borland.com.au">www.borland.com.au</a>	\$1,999; free for Personal edition
Visual Studio.NET Professional 2003	Microsoft	<a href="http://www.microsoft.com.au">www.microsoft.com.au</a>	\$1,115
CSE HTML Validator	Microway	<a href="http://www.microway.com.au">www.microway.com.au</a>	\$220
XMLSPY Personal	Microway	<a href="http://www.microway.com.au">www.microway.com.au</a>	\$190
UltraEdit-32 v10	Microway	<a href="http://www.microway.com.au">www.microway.com.au</a>	\$95
BBedit	Bare Bones	<a href="http://www.barebones.com">www.barebones.com</a>	\$US179
Bluefish	Bluefish	<a href="http://bluefish.openoffice.nl">http://bluefish.openoffice.nl</a>	Free



# Development

## Programming like a pro

**Matt Overington** navigates through the environments, tools and databases that the professional software developers use.

### Integrated development environments

Programmers are a picky bunch. Not only do they tend to swear by a particular development environment, but they're even more obsessive when it comes to specific programming languages.

Which program to use is a moot point because the language employed will determine the integrated development environment (IDE) options. The factors that come into play are language(s), platform and budget.

Cost is a limiting factor for the many non-enterprise programmers who don't have thousands of dollars for a combined editor, debugger and compiler. Microsoft recently made things a little easier in its bid to pull developers away from the J2EE platform and push them towards its free .NET framework.

Developers can download inexpensive code editors that run with .NET, which has a command line compiler for knocking up your own C# applications without shelling out for the whole Visual Studio suite.

This is a great starting point for learning programming because an inexpensive editor together with the framework can be used in concert to produce professional-level applications.

Linux is arguably the developers' platform. Open source tools are bundled with most distros for developing applications in Perl, Python, C/C++, Pascal, Java and many other languages.

Linux — being so popular with the tech elite — means online help is abundant, and the fact that it's free is a huge benefit for shoestring coders.

**Visual Studio .NET**, the premier development environment for Windows, can be used for many programming languages. Most programmers specialise in Visual Basic (VB), so the mark that Microsoft has made with popularising programming is impossible to ignore.

Many hardcore programmers turn up their nose at VB for being too simple and easy, but this has worked in Microsoft's favour. VB

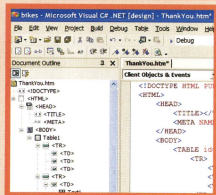
has become the everyday language and a vital weapon in any Windows programmer's arsenal. It's even available for Mac under the **Real Basic** moniker.

VB's success can be directly traced to its short learning curve. A VB developer can be up and running in hours, with no prior programming training.

The Visual Studio series of IDEs is the most widespread application-development platform, and sales are still strong despite initial confusion over the whole .NET scheme. Free plug-ins and PowerToys are available too.

There's little point in Java programmers choosing Visual Studio as their preferred IDE because there are plenty of compelling Java environments on the market. Sun's **ONE** and IBM's **WebSphere** platforms provide total control over Java projects and are strong in the enterprise space.

Borland's **JBuilder** series of IDEs is also popular, and more suited to the everyday Java developer. Available for Windows, Linux and Solaris, it balances power and ease-of-use.



**Visual Aid:** Microsoft's Visual Studio .NET leads the charge for cross-language integrated development environments.

A suite of debugging tools can be used to develop tiny code fragments right up to complicated Java projects.

The Personal edition can be downloaded from the Borland Web site. It's around 70MB, so you may want to download overnight if on a dialup connection.

### Tools and editors

A number of competent editors make developers' lives easier. They can replace a full-blown IDE to create and maintain small code fragments, and are much less demanding on system resources.

For the budget-oriented, they enable code creation and checking while avoiding the price associated with most IDEs.

**Visual Slickedit 8** is one of the best editors for C/C++/C#, Java, HTML, XML and many other languages, but it's not cheap. The full-version download, at \$480, is well on the way to the cost of an entire development suite. Penny-pinching developers may prefer a more specialised editor, such as the **Archinus** range ([www.archinus.com](http://www.archinus.com)), with autoforformatting and autocorrection for C# and Java.

If your requirements are more modest,

check out **EditPlus**. It's merely a replacement for Windows Notepad, but it features autoforformatting and colour coding for source code, and is one of the best lightweight editors on the market. It's a must-have for all power users, not just programmers.

The debuggers and code checkers heavily depend on the size of your project and the language employed. If you spend most of your time working inside an IDE, you can get by without a dedicated debugger by relying on its built-in tools.

On the other hand, if you do most of your programming in an editor before compiling it separately, you'll need a suite of debugging tools. **SmartTrace** can keep track of your program while it's running and is useful for monitoring misbehaving code.

## Databases

If it was tricky picking an outright winner in the programming category, the database field is even harder. The one you choose depends on your needs, finances and level of complexity.

Desktop users favour ease of use over scalability and transaction speed, while high-end users put more emphasis on performance.

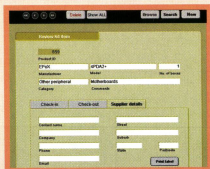
Light database users tend to favour

**Microsoft Access** or **Visual FoxPro** over more robust and complex offerings such as the **Oracle 9i Database**, and IBM's **DB2**. Microsoft Access supports Access Basic, similar to VB, and is more user-friendly than most competitors. The familiar Microsoft interface is a boon for many new users, and help is always at hand for those in trouble.

The Structured Query Language (SQL) has facilitated a database revolution. Virtually all large-scale Web sites interact with a database back-end, and SQL has been widely employed to interact with the Web front-ends. There are two main SQL implementations including Microsoft's SQL Server 2000, and the open source MySQL.

MySQL is adequate for many smaller jobs (like organising a home CD collection), right up to serving page data, but Microsoft's version is clearly aimed at the high end.

Also worthwhile is **FileMaker Pro** for Mac and Windows. This lightweight database



► **Make my day:** FileMaker Pro provides adequate functionality for most small- to medium-sized projects.

can't compete with the full-blown server-side apps for Linux or Solaris, but it's ideal for most modest requirements.

Equipment reviewed in APC Labs was tracked through a simple FileMaker database for years before we needed an upgrade. The biggest advantage is its ease of use. Beginner developers can use FileMaker Pro and churn out a usable, working database in hours.

It's even widely used in schools and first-year university courses to teach database fundamentals.

FileMaker is well supported, with several online resources. It's undoubtedly the best mid-tier database for Mac and well worth a look for Windows.

Product	Contact	Online	Price
Visual Studio .NET 2003	Microsoft	www.microsoft.com	\$2,404
Sun ONE C 6	Sun	www.sun.com.au	\$2,850
IBM WebSphere Studio Site Developer 5	IBM	www.ibm.com.au	\$2702.70
Borland JBuilder 9	Borland	www.borland.com.au	Personal, free; Developer, \$1,998; Enterprise \$7,000
Visual SlickEdit 8	Microway	www.microway.com.au	\$480
EditPlus 2.11	EditPlus	www.editplus.com	US\$30
Access 2002	Microsoft	www.microsoft.com	\$694
Oracle 9i Database Standard	Oracle	www.oracle.com.au	\$22,000
IBM DB2 Universal Database 8.1 Express Edition	IBM	www.ibm.com.au	\$1,248.50
SQL Server 2000 - 2S client	Microsoft	www.microsoft.com	\$22,615
FileMaker Pro 6	FileMaker	www.filemaker.com.au	\$2,000
SmartTrace	SmartTrace Tech	www.smarttracetechnology.com	US\$70
Crystal Reports Advanced 9	Microway	www.microway.com.au	\$2,670
Visual FoxPro Professional	Microsoft	www.microsoft.com	From \$705

## Server level

Dive into to server-level database applications and the waters get murkier. Structured query language (SQL) is king for mid- to high-end apps, as ease of use balances with performance.

The two most popular of the outstanding implementations available are Microsoft's **SQL Server** and MySQL AB's **MySQL**. The Microsoft version's familiar interface will appeal to many, and help files are abundant.

Those on a budget will appreciate MySQL ([www.mysql.com](http://www.mysql.com)), an open source database rapidly gaining in popularity. Its biggest advantage is that it's free, and its cross-platform reach is a boon to developers working in homogeneous environments. It can be downloaded to run under Windows and several Linux flavours. As a result, it's combined with Apache to drive non-commercial Web site back ends.

SQL is adequate for non-enterprise apps but doesn't show the scalability of high-end databases like the benchmark Oracle. But, the Oracle 9i standard edition does cost more than \$22,000.

If your needs fall between modest MySQL and all-encompassing Oracle, take a look at IBM's **Notes/Domino** combination. It's only for Windows, and relies on proprietary structure and commands, so open source advocates turn up their noses. Yet in truth, the combination is one of the most solid and stable environments for SMEs.

## Reports

The range of tools for managing databases and producing reports based on the content is enormous, but the market leader clearly is **Crystal Reports**, now at version 9.

It can snoop into database content to produce detailed documents for marketing or auditing. It's user-friendly but able to extract complex data, taking the pain out of collating large quantities of information for general consumption.



# Business

## Mind your business

The business world demands that its applications are bulletproof. With big companies in the custom solutions and consultancies space, *Justin Kranz* checks out the off-the-shelf products for smaller firms.

### Productivity

Microsoft **Office** suites reign in the productivity stakes for both Windows and Mac machines. Refined to the nth degree, components such as **Word** and **Excel** have become the industry standards users feel comfortable with.

Having pushed the limits of what power users can do with productivity apps, Microsoft has attempted to widen the scope as much as possible. The approach is not always popular because Office has grown more resource-intensive as users have been given more options.

Microsoft jumps on the XML bandwagon with its impending Office 2003 suite. XML's open standard is one reason to choose it over the Windows home team. Another is Microsoft's subscription-based licensing, which has met with a lukewarm reception.

Abundant cheaper alternatives to XML retain the compatibility but with fewer bells and whistles. Sun Microsystems' **StarOffice** and its open source version, **OpenOffice.org**, imitate the market leader's core functionality. OpenOffice.org is a free download, and StarOffice is priced lower than XML. But

that's only part of the charm. Compatibility is the real clincher: Windows, Linux and Sun's own Solaris platform for StarOffice, with OpenOffice.org adding Mac OS. Compatibility extends to Microsoft file formats, essential to any office suite, and support for XML, PDF and Shockwave Flash (SWF) formats.

For standard office use, Sun's productivity offerings are hard to fault. Excessively complex documents can cause erratic performance, but both suites can handle the vast majority of applications in their stride.

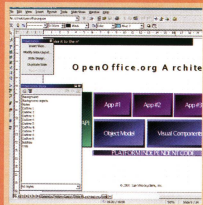
**Corel's WordPerfect Office 11's** pricing is more affordable than Redmond. Corel has learnt the hard way that interoperability is king, but it's still done in a slightly clunky manner. For example, documents must be initially converted to WordPerfect's proprietary format.

Graphics also have to be in WordPerfect, further distancing the product from other big guns' "come one, come all" approach.

Corel's competitiveness is encouraging but it still has a long way to go to threaten the Sun or Microsoft offerings.

### Presentation

**Impress**, the Microsoft PowerPoint-compatible presentations app in StarOffice and OpenOffice.org, is aptly named. Not only is it free (from [www.OpenOffice.org](http://www.OpenOffice.org)), but it stands up well against the incumbent PowerPoint series.



➤ **OpenOffice's Impress:** just as good as PowerPoint, only free.

Impress' online publishing tools make Web presentations painless and easy. Minor

issues with importing PowerPoint presentations have been reported — when handling the TrueType Comic Sans font, for example, it's advisable to do one final check before taking your pitch to the boardroom — but aside from that, it's smooth sailing.

Microsoft PowerPoint has changed little over the years, and the very slow improvement made PowerPoint 2002 less than a must-have. It could be argued that some changes, such as an annoying autoforwarding function, have in fact set the series back. An expanded range of visual effects, abundant smart tags and template tweaks are too little, too late.

### Accounting

The furore over Quicken's re-registration charge may have dampened enthusiasm for the company, but its software remains on point. **QuickBooks 2003** comes in a variety of prices and flavours, and is easy to use in all of them. There's still a wealth of features. Forecasting and reporting tools, comprehensive payroll options, costing, stock control and business planning abilities make QuickBooks the ideal meeting of SOHO and enterprise-level tools.

Quicken's Enterprise tools can handle businesses with up to 150 staff. Larger small- to medium-sized enterprises (SMEs) normally require a custom enterprise resource planning (ERP) application to handle the increased complexity.

Quicken and **MYOB** claim the lion's share of the

small business and accounting market in Australia. Like Quicken, MYOB has products on a sliding cost/functionality scale. MYOB Premier, aimed at expanding SMEs, allows multiple users (additional licenses can be bought later), an extensive support structure and a focus on user-friendliness. MYOB has strong multiple-currency support ideal for import/export-based operations.

Unlike Quicken, MYOB's range offers Mac-specific business computing with AccountEdge, as well as limited compatibility with Mac file formats in its Windows-based software.

Although MYOB can be cheaper than QuickBooks, it has fewer features — no forecasting tools, and advanced payroll and reporting features must be bought separately.

## ecommerce

**ezimerchant Professional** can create functional ecommerce sites rapidly and with a minimum of task switching. But it's not only shopping carts for newbies. Experienced back end programmers will appreciate the ability to import customer and stock data from ODBC databases, and to adjust a number of product flags.

Basics including credit-card processing and GST calculations are taken in stride, and there are multiple freight calculation options on-the-fly. An HTML editor theoretically allows creation of the entire site within ezimerchant, although the program is designed to work with any HTML editor.

Extra touches cement ezimerchant Professional's status as a leading product for local markets. They include custom field manipulation for Amazon-style effects and more than 100 different themes. Welcome client-servicing additions are 128-bit SSL encryption and bulk email to customer databases.

If supported ecommerce solutions are needed, ACCPAC's **eTransact** module may appeal. Designed to integrate with ACCPAC integrated applications, eTransact markets itself as B2E — business to everyone. Tight integration means that changes made at any stage of the inventory or pricing processes ripple through to all relevant stages of the operation.

eTransact focuses on customisation options. Administrators can control which customers see which products and at what prices, with an approach normally beyond the reach of shopping carts.

The downside? eTransact runs concurrently with other ACCPAC apps but not in isolation.

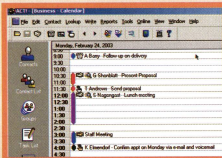
## Customer relationship management

In the customer database field, the leader is a hard act to follow, both in name and practice.

**ACTI** has versions for the Web, PDAs and, of course, PCs. ACTI 6.0 eliminates limitations on the number of notes and memos about contacts in a database and allows information to be tabulated exhaustively. More than 70 pre-defined fields can be combined with user-defined categories to present a complete profile. Also of use is the appending and logging of messages within Outlook to ACTI contact details.

Building a comprehensive client history is made easy by the program's intelligence in finding and adding useful information. Palm and Pocket PC compatibility remains a mainstay — more critical for contact management than most PDA apps. Additional ACTI modules allow integration with some accounting packages, making ACTI's rudimentary forecasting functions more attractive.

**IndeoCRM** is budget-oriented and both Linux and Windows compatible, making it ideal for knowledge workers needing a contact manager with minimum fuss. Running off SQL Server or SAP, the program offers ease of use and speed, but not mountains of categories or options. Designed to be modular, the generic nature of outputting assists the information flow. IndeoCRM reports can be generated in PDF, Excel or HTML formats.



► **A hard act to follow:** ACTI 6.0 eliminates limitations on the number of notes and memos about contacts in a database.

Product	Contact	Online	Price
Microsoft Office 2003	Microsoft	www.microsoft.com.au	\$1,099
StarOffice 6.0	Sun Microsystems	www.staroffice.com	\$179
OpenOffice.org 1.0	Sun Microsystems	www.openoffice.org	Free
WordPerfect Office 11	Corel	www.corel.com	\$569
Impress	Sun Microsystems	www.openoffice.org	Free
PowerPoint 2002	Microsoft	www.microsoft.com.au	\$680
QuickBooks 2003	Quicken	www.quicken.com.au	\$259 (upgrade)
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MYOB Premier	MYOB	www.myob.com.au	\$1,495
MYOB AccountEdge	MYOB	www.myob.com.au	\$595
ezimerchant Professional	ezimerchant	www.ezimerchant.com	\$449
eTransact	ACCPAC	www.accpaconline.com/hostedsolutions/etransact.asp	Dependant on product commitment
ACTI 6.0	ACTI	www.acti.com	\$249 single user; \$1,245 six users; \$212/user for 10-24 users
IndeoCRM	Synergy Information Services	www.indeosolutions.com	US\$500 min.



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PHP 4.2.3 & modules  
PHP XML/XSLT  
Python 1.5.x  
Server Side Includes

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Extra server space  
Extra POP accounts  
Extra server aliases  
Shared SSL certificate  
Dedicated SSL certificate  
Webalizer site stats  
Urchin 4 site stats  
PostgreSQL & MySQL

### Standard Windows features

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ASP  
AspEmail  
AspJpeg  
AspUpload  
CDONTS  
JMail  
Microsoft Access  
Microsoft FrontPage extensions

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## Big future

**Intel-based systems are climbing the supercomputer charts, their presence in the Top 500 list nearly doubling in six months. David Braue reports on how tomorrow's desktop platforms will be based on today's big iron.**

Conventional desktops and servers pale in comparison to the performance of supercomputers: specialised systems that have been pushing the performance envelope for decades. But in the same way that desktop and server processors continue to improve their price-to-performance ratios, the supercomputer market is booming, with prices falling and high-powered alternatives giving potential customers more options.

Supercomputers rule the domain of applications with immense data sets: simulations in petroleum exploration and production, structural analysis, computational fluid dynamics, physics

and chemistry, electronic design, nuclear energy research and meteorology.

The world's largest supercomputer, the Earth Simulator, housed at Japan's Earth Simulation Centre, switched on early last year. Designed to allow for simulation of incomprehensibly complex environmental models, it incorporates 640 eight-processor computing nodes — for a total of 5,120 processors — and delivers 40 teraflops of peak performance. (The number of floating point operations a system can complete in a second is measured in flops, and a teraflop is a trillion flops per second.)

1958



Seymour Cray builds the CDC 1604, the first transistorised supercomputer.

1964



Cray's CDC 6600 is 40 times faster than the 1604. It features 10 functional units and 32 memory banks operating in parallel, delivering performance of 1 megaflop.

1969



Cray builds the CDC 7600, the first vector supercomputer, which introduces the concept of pipelined processing.

1969



IBM releases the 360/91, with features such as instruction look-ahead, to run at twice the speed of the CDC 7600.

1976



Los Alamos National Laboratory takes delivery of the Cray-1, using freon cooling to deliver 100 megaflops.

That's 20,000 times the speed of a 2GHz Pentium 4 processor running at just over 2 gigaflops.

## MAN WITH A MISSION

The supercomputer was the brainchild of Seymour Cray, who began his mission to create the fastest computer in the world in the 1950s. His CDC 1604, built in 1958, was the first fully transistorised supercomputer and the first of many systems that would make the Cray name synonymous with unmatched performance. Successive generations included the 60-bit parallel processing CDC 6600 (40 times faster than the 1604) and the CDC 7600.

After a falling out with his business partner in 1972, Cray went on to found Cray Research. By 1976, that company's Cray-1 supercomputer delivered 100 megaflops of performance. In 1985, the Cray-2 passed the 1 gigaflop mark and in 1989 the Cray-3 hit 4 gigaflops.

Revolutionary for the time, the Cray-3 used 1GHz gallium arsenide processors instead of relying on the silicon manufacturing processes still used to make most other chips. The Cray-4, which doubled the Cray-3's performance, was his last innovation before the 71-year-old died from head injuries after a car accident near his Colorado home in 1996.

The key to Cray's innovation was computer construction using vector processors — vector in this case referring to a mathematical matrix with only one row — that are adept at handling large volumes of data arranged in matrices, or tables full of values.

Organising data in matrices provides some fundamental performance improvements, since the mathematics of matrix calculation is well understood and allows large data sets to be manipulated very efficiently. And because supercomputers are designed for such problems, they thrive on matrix mathematics. While most mass-market CPUs can process numbers at a rate of just 2 bytes per CPU cycle, systems such as NEC's SX6 supercomputer can process 256 bytes.

"The increase in the speed of [commodity] processors has enabled scalar systems to get close enough for a lot of applications," says Chris Collins, national sales manager for NEC Australia's Supercomputer Division. "But vector computers were invented to meet the needs of the scientific community. These are aimed at people with really serious science to do."

Scientific modelling, including environmental and nuclear simulations, are among the major applications for supercomputers, according to [www.top500.org](http://www.top500.org) (generally accepted as the definitive global ranking of supercomputer sites). The 20 fastest computers in the world are found predominantly at organisations such as Lawrence Livermore National Laboratory, Los Alamos National Laboratory, the National Energy Research Scientific Computing Center (all in the US), the National Aerospace Laboratory of Japan and the French Atomic Commission.

Australia's fastest listed supercomputer is the Hewlett-Packard AlphaServer SC E545 installed at the Australian Partnership for Advanced Computing (APAC) in Canberra. Its maximum performance of 825.50 gigaflops puts it at number 79 on the list.

Australia has four other sites in the top 500 (see table on page 85), all at universities or partnerships for advanced computing established in major cities by universities keen to buy into supercomputing without footing the total cost.

Over time, the list reveals that supercomputers are nowhere near as common as they used to be. Cray's highest-ranked system, a 1900-CPU machine, in an unnamed US government organisation, ranks at number 44 with 1,166 megaflops, and the company has only 25 other systems — including the two at its own labs. NEC has 14 customers in the list, Fujitsu 12 and Hitachi 10. The other 438 (88%) are conventional Unix systems from HP, Sun, SGI, and IBM.

This is significant because Unix-based systems are scalar, as opposed to vector, machines. Rather than handling large matrices of data at once, they process data through parallel processing, breaking tasks into smaller chunks and devoting each individual processor to a part of the problem. The results are then collated by the software running on the system, which delivers meaningful results to the system's users.

## SCALAR HOUSEKEEPING

Ironically, the complexity of coordinating data across so many processors makes programming scalar systems harder than programming supercomputers, which don't have to do as much housekeeping.

Scalar systems are generally built using standard 32-bit and 64-bit processors, which not only move less data than vector systems but are unable to address anywhere near as much memory



1982



Fujitsu ships its first vector supercomputer, the VP-200, which peaks at 500 megaflops.

1985



Cray Research launches the Cray-2, running at more than 1 gigaflop.

1989



Cray Research launches the Cray-3, using 1GHz gallium arsenide processors to deliver over 4 gigaflops of number-crunching capability.

1991



Thinking Machines Corporation launches the CM5, delivering 100 gigaflops.

1993



IBM delivers the SP1 Power Parallel System, based on conventional PowerPC CPUs.

1995-96



Cray Research bought by SGI. SGI/Cray launches the Origin 2000 supercomputer.



per processor. Vector systems also use specialised memory that runs as quickly as the cache memory built into desktop microprocessors and systems. But while desktops have just a few megabytes of cache memory to mediate between the processor and the rest of the system, supercomputers may have hundreds of gigabytes of such memory.

While they're built for speed, vector systems are extremely expensive. This has been their Achilles heel compared with scalar systems, which are built using less-expensive components and have been gaining momentum among research organisations, where funding is always an issue. In many cases, organisations that might have bought a vector computer are comparison shopping and finding they can get along with a scalar system just fine.

The South Australian Partnership for Advanced Computing shelled out \$1.7 million this year for SA's first supercomputer, a scalar system fast enough to propel the installation to number 109 in the Top 500. By comparison, the Bureau of Meteorology (BoM), which will soon have an NEC SX6 vector supercomputer delivering up to 1.7 teraflops of performance by 2004, has pegged the value of that contract at around \$30 million over four years.

"Weather models essentially take a rave and trace it over the surface of the earth and at several levels," explains Phil Tannenbaum, manager of the BoM's High Performance Computing and Communications Centre in Melbourne. "You have very large quantities of contiguous data. For this type of operation, vector processing is very good. When it fully comes online and we go to the next-generation weather model, we should be able to do better forecasts for a longer period of time."

#### DRIVEN TO BANKRUPTCY

The rise of scalar servers hasn't been due to their competitive cost alone. As Japanese supercomputer-makers became increasingly aggressive in their pursuit of opportunities, US-based Cray saw its hold on the market slipping away. It successfully sued NEC for "dumping" its products — selling at unrealistic prices just to clinch a sale — and convinced the US Department of Commerce to introduce a 460% import duty that effectively locked Japanese makers out of the US market.

It was a Pyrrhic victory. The companies simply focused on other countries, and in a declining market Cray was first sold to SGI, then in 1995 was driven into bankruptcy. Several years later, the US government, frustrated by the lack of domestically produced vector

supercomputers, revived Cray and helped it back on its feet.

But it may well have been too little, too late. The embargo-driven death of vector systems provided an opportunity for IBM, HP, SGI and Digital (bought by Compaq, now part of HP) to build massively parallel scalar systems out of the building blocks they were using in conventional servers and desktop PCs.

Some universities used Beowulf clustering techniques ([www.beowulf.org](http://www.beowulf.org)) to coordinate hundreds of desktop PCs into defacto supercomputers, but it was only in the past couple of years that the Intel-based supercomputer really came into its own.

#### CALL IT HIGH-PERFORMANCE

That market segment is now well populated with massively parallel systems built around Intel Xeon or Itanium 2 processors, providing 32-bit or 64-bit processing capabilities that are typically being made available for researchers and a few large private interests. Because it still connotes an extremely high-performance vector design, "supercomputer" has gradually been replaced with the more general term "high-performance computing" (HPC).

"The driver is the systematic collection and storage of data," says Shahin Khan, Sun Microsystems' US-based vice-president for high-performance and technical computing, who believes lower price points for HPC systems will increase their popularity for general business use.

"When data goes beyond a certain point, the only way to deal with it is through HPC methodologies. The trend is unmistakable. I believe this will gather steam over the next two to five years, and there will be a definite trickle-down effect in which HPC innovations show up in more commonly used systems."

The nail in the coffin for vector systems has been Linux, its open design has made it a favourite with researchers always looking for better ways of building simulations and models for their work. Openness is critical in the scalar environment, since it helps programmers tailor their computational models around the inherent difficulties in programming scalar systems.

It's no surprise, then, that IBM's Linux-based xSeries systems now account for the majority of HPC sales in Australia, and even Sun Microsystems, a longtime rival of Intel, recently launched a series of Intel-based systems running Linux.

Sun's first taker was the University of Queensland, which has purchased a Sun Fire V60x server that will use a total of 256 2.8GHz Intel Xeon processors and Linux to provide 1.4 teraflops of

&gt;&gt;

1997



Sandia National Laboratories commissions Intel Paragon ASCII Red machine, delivering 1.8 teraflops (expanded to 3.2 in 1999).

1999

Lawrence Livermore National Laboratory commissions the ASCI Blue Pacific machine, delivering 3.8 teraflops.

2002



The Earth Simulator, still the world's fastest, provides 36 teraflops of processing capacity for environmental research.

2002

IBM wins contract to supply Lawrence Livermore National Laboratory with a pair of supercomputers, ASCI Purple and Blue Gene/L, which will provide three and 10 times respectively the computing power of the Earth Simulator.

2003-

Blue Gene/L, which will set a new speed record when completed, is the first in a new generation of supercomputers being developed under the codename Cyclops. IBM expects it will deliver over 1 petaflop (1,000 gigaflops) of computing power in the next few years.

2003

Chinese company Dawning Information Technology and AMD announce plans to build the world's third-largest supercomputer, to use 2000 conventional AMD processors and deliver 10 teraflops.

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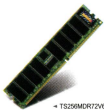
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"We've gone for a large-scale cluster system, because the architecture and what it's designed to do are very much complementary," says Professor Sean Smith, head of the university's Centre for Computational Molecular Science, where the system will be housed.

"It's a tremendous machine, and its SMP architecture gives it particular abilities for supporting very large memory calculations. We're not looking at running things that require huge memory, but we're looking for massive throughput in small- to medium-sized molecular calculations. Economies of scale have tended to drive us towards clustered systems based on Intel processors."

#### RESPONDING TO INTEL

Although Intel-based systems are literally climbing the charts — the tally in the Top 500 nearly doubled in the six months between the previous list and the current one — some vendors are still trying to differentiate themselves with scalar systems based on proprietary technologies.

For SGI, that differentiation is coming from the company's strength in visualisation, which pairs sophisticated graphics technology with supercomputing grunt to produce a high-end computing platform that's been popular in molecular modelling, visual design, 3D simulation and other environments involving representation of complex data sets.

SGI's recently launched Onyx4 UltimateVision system improves performance over the previous generation by eight times, and supports up to 32 graphics processors (a typical desktop has just one) to render extremely detailed images in real time. Entry-level Onyx4 systems deliver 20 million pixels, while high-end systems' push this over 100 megapixels — enough to power fully immersive computing environments.

The detail provided by SGI's visualisation systems has made them popular among researchers in life sciences, engineering and other fields that regularly deal with extremely large and complex data sets. They're also used in areas such as fluid dynamics and process manufacturing.

Longtime SGI customer Procter & Gamble, for example, uses its SGI technology to design better disposable nappies. The manufacturing giant also uses the SGI systems to model the airflow

over Pringles potato chips, so it can reduce breakages when thousands of chips are shot through the air into cans during manufacturing.

"Designers are aiming for more fidelity in their models so they can get insight more quickly," says Bill Trestrail, managing director of SGI Australia. "Now, automotive manufacturers are not only wanting to model their cars [in crash simulations] but they also want to get into the human body to find out, for example, what's the damage on capillaries in human lungs."

Australia's first Onyx4 customer is the Defence Science and Technology Organisation, which will soon install the system in its Fishermans Bend aviation research complex. The system will be used for applications including the production of increasingly realistic simulations for pilot training and equipment testing.

While it's determined to continue its Onyx line, SGI has made a big concession to the rise of Intel-based servers. Prices for the Onyx4 start at around US\$45,000 — one-fifth the price of SGI's previous Onyx InfiniteReality.

Although prices go a long way up from there, the low entry point could make Onyx4 far more price-competitive with high-end HPC scalar systems.

Onyx4 also introduces Visual Area Network, a technology that SGI says allows applications to be resized and delivered to users running notebooks, handheld PCs and other small terminals.

Trestrail believes the new system's specifications and competitive price will make it a compelling purchase for funding-starved researchers, for whom price can be a major impediment to supercomputer access. At its old price range, SGI's systems were simply too big and expensive to be widely deployed, but Onyx4 takes a building-block approach that lets the systems be expanded to suit users' changing needs.

"We're moving a lot more to embrace the economies of scale that come from industry-standard servers," Trestrail says. The goal is "to bring pricing down and make it more granular so people can get into them, then get performance increases later by adding processors and graphics in small increments".

Can SGI continue to provide enough value to keep customers away from its competitors? Will the dynamics of a tough economic market spell disaster for vector supercomputer makers? Will tomorrow's commodity servers and desktops have so much processing grunt that supercomputers will become irrelevant?

Just what's in store for this niche market remains to be seen. **apc**

## AUSTRALIA'S PLACE IN THE PANTHEON

Top500.org rank	Location	Supplier	Model	CPUs	Maximum performance (gigaflops)	Peak performance (gigaflops)
<b>79</b>	Australian Partnership for Advanced Computing (ACT)	Hewlett-Packard	AlphaServer SC ES45	508 x 1GHz Alpha	825.50	1016.00
<b>109</b>	South Australian Partnership for Advanced Computing (Adelaide)	IBM	xSeries cluster	256 x 2.4GHz Intel Xeon	682.60	1228.80
<b>124</b>	Victorian Partnership for Advanced Computing (Melbourne)	IBM	xSeries cluster	192 x 2.8GHz Intel Xeon	629.70	1075.00
<b>358</b>	Swinburne University Centre for Astrophysics and Supercomputing (Melbourne)	Dell	PowerEdge 2650	180 x 2GHz & 2.2 GHz Intel Xeon	343.40	768.00
<b>484</b>	University of Melbourne	IBM	xSeries cluster	104 x 2.4GHz Intel Xeon	246.40	499.20





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- Auto double sided option
- 1.2m long banner printing
- Nice and easy media flexibility
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- 1200 x 1200 dpi resolution (7500)
- Automatic multi-function driver tools

## **OKI C9000 Series** DIGITAL COLOUR PRINTER

- High speed 30ppm A4 colour printing
- High speed 37ppm A4 mono printing
- Auto double sided option
- 1.2m banner and A3 printing
- Nice and easy media flexibility
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## Pioneers in log-in cabins



**Australia has its share of extreme networkers, blazing the way for the automated and remote-controlled lifestyles of our near future.**

**William Maher reports.**

While most people are content with wiring the kids' PCs to a printer or setting up a LAN for games, Stephen Yorke has gone further.

When he says he has everything wired, he means everything. His house (pictured above) in Newcastle, NSW, is tricked-out with an über-network of sensors, switches, cameras, Web tablets and music servers. Anyone moving on the drive is detected

and recorded. Rain and temperature gauges control skylights and garden sprinklers.

Air-conditioning, internal security and video are all taken care of. "Party mode" music and lighting is a button-push away.

Stumbling into a comprehensive home network like Yorke's, you might think you're in an office-block server room. Between the bathroom and bedroom are humming

closets crammed with racks of PCs, routers, cabling and audio equipment.

Yorke is no dot com millionaire. An installer of automated home networks, he introduced himself to the ultra-wired lifestyle of the rich and famous a few years ago by adding a keyless entry pad to his front door. It soon became addictive. "Once you live with a bit of this stuff, you miss it if it's not there," he says. Now he can log on from his nearby office using Windows XP's remote desktop function and Wi-Fi. Even his letterbox is wired — unfortunately it doesn't have a junk mail filter.

Like Microsoft's Bill Gates and Oracle's Larry Ellison, who have spent millions on geek-fitting their homes, a small but growing number of Australians are into extreme networking. We get to watch these 21st-century guinea pigs without having to fork out the cash, which is just as well. Yorke, who says he finds most regular homes "archaic", knows that none of this comes cheap. Some people have spent more than \$100,000 already.

"Some say that's too much money, but

### Plug and Play

Hooking up a plethora of PCs, notebooks, handheld PCs, digital cameras, printers, set-top boxes and stereos is a headache. Intel reckons it has made things easier by applying the plug-and-play concept to LAN. With Universal Plug and Play (UPnP), you no longer have to take care of setting up addressing, network configuration, firewalls and other annoying things. Future devices might come equipped with this.

Intel is collaborating with Sony and others to get UPnP into consumer devices. They'll be able to handle a baseline of file formats including JPEG, PNG, MPEG-2, GIF, TIFF and MPEG-4. That's right — electrical shopping is about to get even more confusing. See [www.dhwg.org/home](http://www.dhwg.org/home) for more information.

## Optic fibre

The ideal in home and office connectivity is optic fibre, those ultra-thin strands of glass that can handle multiple digital TV streams, telephone calls and the kind of big data downloads that bring cable and ADSL users to their knees. With fibre, you get to laugh at your gaming enemies' ping times, sneer at your ISP's data caps and generally act like a broadband king.

In South Perth, Western Power took the opportunity to lay fibre optics while burying overhead cables. Fibre-to-Ethernet switches allow users to plug in network cables, telephones or digital devices such as set top-boxes for video-on-demand or interactive TV.

This stuff's limited to the rich or lucky right now. Cheaper Ethernet technology and electronics for the home have made fibre optics less expensive, but no-one's digging up Australian streets to lay it down. It's the same story overseas, where the chance tends to come when building new suburbs. At least we're experts; Australia has a strong niche industry in optical chip technology (photonics). Visit [www.brightonline.com.au](http://www.brightonline.com.au) for more details.



people spend \$60,000 on a car," he says. "Some people have a different priority and spend \$60,000 on their house [network]. It's a value-add."

### BORING PLUMBING

Right now, the networks are functional, relatively fast and easier than ever to install. But they're boring. Those blue CAT5 cables mostly get treated like plumbing: if you want to print from the second PC upstairs, you run a wire to the printer downstairs. Sure, it's practical, but where's the tech cool in that?

Yorke and his ilk are showing what life will be like when the wires and Wi-Fi

## We get to watch these guinea-pigs without having to fork out the cash

linking PCs and printers are transformed into an all-encompassing matrix, seamlessly connecting everything inside and outside our homes and offices.

We've been told the possibilities are endless, but the reality has been less than revolutionary. This year the IT industry celebrated the 30th anniversary of Ethernet, the standard protocol in PC networking. It has conquered the desktop — it's probably used in more than 90% of networks and speed has increased from 10 megabits per second (10Mbit/s) to 10 gigabits per second (10Gb/s) and beyond.

But at the same time, we're mostly still using plain old telephone cable for broadband. Inside the home, wiring three or four PCs for gaming sessions is about as creative as most of us get. Efforts to promote the digital smart house — like Cisco's cable-stuffed iHome at exclusive Jacksons Landing in Sydney — have failed to spark a consumer networking frenzy.

Now breakthroughs such as wireless are finally giving networking the appeal it needs. Antennae on notebooks are making it easier to go online "anywhere anytime". Intel touts the advantages of notebook emailing without wires.

The idea is that one day we'll all be plugging into a single megalink for Internet, digital television and telephony. We'll be going online with PCs, TVs, stereos, set-top boxes and a range of other consumer devices. Already, digital video recorders can connect to the Internet to check TV guides, and touching a screen can select the PC in the bedroom or the TV in the lounge for viewing.

But to get there, the data pipes need to get faster and smarter, and this is where such breakthroughs as network-ready products and ultra-fast broadband come in.

### THREE PRONGS IN PERTH

Australia's first commercial trial of domestic optic fibre is taking shape in South Perth. A few lucky Internet users will find their connection catapulted to a maximum 10 to 100Mbit/s. And that's per person,

not the shared bandwidth of Telstra and other ADSL providers.

Such firepower would make KaZaA users weep with joy, although sucking down illegal copies of blockbuster movies isn't the intention. The idea is that these links will supply broadcast services including digital TV channels and telephone calls in a three-pronged approach that could help make residential fibre networks profitable after years of costly experimentation.

"If you build the cable out there, you can sell video, telephony and Internet services," says Ericsson's Tony Malligeorgos. "You can open up access and let a whole range of other service providers get onto that network as well."

Remember that broadband and networking will enter "phase 2" in coming years with video services added to Internet traffic. Three or four digital channels at 10Mbit/s will be an enormous hit to take.

While phone companies and ISPs have been loading copper phone lines to the limit, the fastest Ethernet networks offer 1,000Mbit/s and even more (see page 136). Humble Ethernet has been

## GigE speed

You could be networking at 10 times the speed of your current LAN. Gigabit Ethernet (GigE), the new workhorse in the Ethernet lineup, runs at a cool 1,000Mbit/s. When you want to do more than share files and printers, GigE transforms your network, allowing businesses to run their telephones over the LAN, video-conference and host training sessions. See our Workshop on page 136 for details on how you can configure your own GigE network.

With your LAN set up (you'll want copper or optic fibre, depending on distance), all you need to do is slot a new GigE card into your PC. High-end workstations are already shipping with GigE installed.

When really big iron is required, look no further than 10Gigabit Ethernet. A twisted mutation of the basic LAN, this 10,000Mbit/s monster is for telecommunications pipes linking office towers, or connecting huge databases for servers.



Humming along: Stephen Yorke's home setup.

twisted and tweaked to fight off decades of competing technologies, and it's entering new territory. The 10Gbit/s variety is being considered as an alternative to telecommunications links.

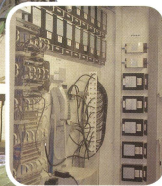
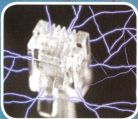
The LAN's exponentially expanding capabilities mean it can be used for telephone calls, streaming video and, for those in business, training staff over the network. Companies including accountants Ernst & Young in Australia have already bought 4,500 new PCs with Gigabit Ethernet cards installed. The problem is finding a network with the capacity to carry all the data.

## Power to burn

On the way are networks carrying electricity, as well as the usual data, to power devices. Wireless access points can be positioned without worrying about finding a handy power point. It's not a new concept (USB and FireWire can supply power and data together), but now it's being tried over the LAN.

Standards group IEEE has a special Ethernet power project that allows a device

to draw DC power from the cable through a normal RJ-45 connector.



And that's where the great fibre upgrade comes in. Exactly how personal fibre links would work in Australia, with its scattered population, is unclear, but there

would be the added bonus of solving the Internet reliability and maintenance issues that plague older technology such as ADSL-equipped telephone exchanges.

Once the glass is in place, simple electronic switching will make speed upgrades easier and cheaper. Fibre with a lifespan of up to 40 years could provide homes with up to 1Gbit/s.

"Fibre is the new copper," says an Ericsson spokesperson triumphantly, as, all over the world, the giant optic upgrade inches its way along.

## MEET THE JETSONS

Plugging into high-octane data services is one thing, but what to do with the data is another. In the Jetson-like surroundings of a networked house on Sydney's north shore, Chris McGowen shows how he gets a digital music feed from a PC upstairs to every room in the house. He presses Dinner Party on a downstairs touchscreen; the lights dim and blues wafts from speakers. The key to the system is a small box that converts the WMA tracks to analogue.

McGowen applies the same networking mindset to other appliances and devices. The whole house is wired for sound and vision; with a wireless Tablet PC McGowen can dial up *The Lord of the Rings* on the nearest TV or mix and match music from his CD collection.

Ordinary homeowners might wonder if this is tech overkill, but in McGowen's mind it's just plain practical. "I have about 400 or so CDs," he says. "But I came across someone the other day who had 1,500, and he was wondering why he'd want a system like mine. I said, 'Mate, if you've got 1,500 CDs, you've gotta have a system like mine.'"

For McGowen, being this wired is all about "pure convenience". In the morning

an automated voice reminds his six- and eight-year-old children they have 20 minutes to catch the school bus, and to turn off the music and lights on their way out the door. He has programmed the announcements to use a proper English accent. "Excuse me Chris, please put the dustbins out," he jokes, mimicking a British butler.

Hidden tricks have surprised the odd babysitter and embarrassed McGowen's children, who've been attacked by the system's over-enthusiastic automatic garden sprinklers. But for the most part, nearly everyone finds it useful. "My little daughter builds up a stack of magazines and stands up on that, finds Barbie Pool Mix and away she goes."

## Ultra Wideband

Wi-Fi's powerful cousin is Ultra Wideband (UWB). This radio technology provides a supercharged, short-distance, invisible network with data rates up to a phenomenal 500Mbit/s. The trade-off is range — a radius of up to 5 metres compared with 50m for Wi-Fi. But at 10m, chipmakers claim to be able to achieve 100Mbit/s.

UWB is an enticing replacement for short-range wireless Bluetooth technology. Better still, the ultra-fast wireless LANs won't drain batteries like Wi-Fi.

As with the birth of Wi-Fi, UWB is being criticised for radio interference.

The technology is unavailable in Australia and strictly limited in the United States. A few chipmakers, notably Cisco-backed XtremeSpectrum ([www.xtremespectrum.com](http://www.xtremespectrum.com)), are producing UWB chips, including what it says is a version optimised for wireless home networks.

UWB is being considered as an official standard for wireless "personal area" networks. Visit [www.uwb.org](http://www.uwb.org) for details.



Push McGowen a bit and he admits there's a certain amount of cool involved. He's no Trekkie, but he likes watching all the sci-fi movies. "I enjoy the challenge of [thinking about] what the future could be like and what technologies we might have."

He applies this networking mindset to nearly everything. While other people are wondering if their notebook has Wi-Fi, he's thinking about the TV and stereo. "I spend my life looking for devices with Ethernet capability," he says.

Companies are trying to make this kind of ultra-wired mentality mainstream. A new agreement between Intel, Sony and other major appliance manufacturers aims to make it simpler to add a growing number of components to the network.

The idea is that devices come with certification or a logo declaring them LAN-ready. As well as having an Ethernet port, they will be able to handle a baseline of digital formats such as JPEG and MPEG-2.

But the key development could be smart networking. Using the Universal Plug and Play protocol, a full range of domestic devices would automatically configure and connect. Entertainment, domestic control, communications and the PC LAN would be combined in a single network of programmable devices.

At this year's Sydney Home Show, bemused homeowners got their first look at the technology. Among it was a beta version of home-control software from McGowen's company, Advanced Living. With a Flash front end, it turns the home into a customisable, tweakable, hand-controlled network.

The question is, how far are we willing to go in emulating the wired lifestyles of Gates and co? While much of the rest of the computing world furrows its brow, the likes of McGowen wet their lips. But even he says: "The dream is that the toaster and the fridge are going to talk to each other. But what are they going to say?" **ETTC**

## Happening things

**BushLAN:** it uses unused VHF television spectrum to provide speeds of up to 1Mbit/s to rural areas up to 100km from an ISP. Tests on the NSW south coast.

**802.11g:** you get the cool 54Mbit/s speed, and it's compatible with existing Wi-Fi. Devices are being certified.

**IBurst:** broadband from the sky. It slices parts of the 3G phone spectrum into "personal broadband" channels. Being tested in Sydney, see page 17 details.

**InfiniBand:** initially a replacement for PCI, it hooks supercomputers and servers to 6GB/s. Available now (pictured below).

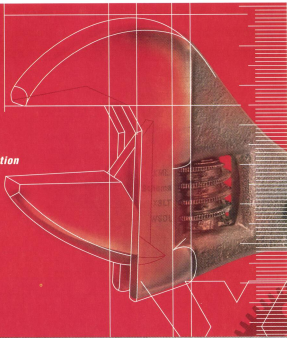


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EVERYTHING CONNECTED

# WORKSHOP

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## Virtual private networks

Want secure access from anywhere to resources on your home network?

*James Bannan* explains how to connect with a virtual private network.



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*Matt Overington* reports that lightning-fast home networks are within reach.



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## Packet-filtering firewalls

Setting up a packet-filtering firewall to share an Internet connection under Linux sounds difficult, but, as *Jarrod Spiga* demonstrates, it can be simplified.



## Bonus CD software

Most Workshop articles are accompanied by bonus software loaded onto our cover CD set — just look for this icon. This is often software that's integral to the article. The selection ranges from full-working versions and trial versions to shareware and freeware.

APC cannot provide tech support for these programs, but if you have a problem with the CD itself, by all means holler our way (see pages 12-13 for how to contact our CD team).



## www.howstuffworks.com

Ever wondered how a semiconductor works? Or how a four-wheel-drive balances the load across its tyres to maintain traction? Howstuffworks.com has been a favourite of geeks for years.

The name says it all: it's a massive database of articles explaining the operation of almost every conceivable object and system. As well as mechanical and electronic equipment, it covers legal, political, environmental, sociological and financial setups. The approach is straightforward, in plain English. Articles are divided into nine topics including ComputerStuff, AutoStuff, EntertainmentStuff, MoneyStuff and PeopleStuff. The list of entries is seemingly endless, with articles ranging from how routing algorithms work to how the Euro became the pan-European currency.





# Tunnelling home

**Want secure access from anywhere to resources on your home network? James Bannan explains how to connect with a virtual private network.**

Ever worked on a presentation on your home computer and when it was due at work, you turned on your laptop and realised it was still on the hard drive at home? Instead of delaying the presentation and rushing home, it would have been easier to connect to the home computer from work to download the file.

With a virtual private network (VPN) you can do this quickly and securely from any Internet access point.

## HOW IT WORKS

A VPN creates a transmission control protocol/Internet protocol (TCP/IP) "tunnel" using one of the popular tunnelling protocols — generally Point-To-Point Tunnelling Protocol (PPTP) or Layer 2 Tunnelling Protocol (L2TP). The creation of the tunnel is negotiated between the VPN client and the VPN server, and instigates from the client, like a dialup connection.

Once the tunnel is established, data packets encapsulated within a tunnelling packet use it for direct communication between the connected machines.

For greater security, the encapsulated data is also encrypted using the specified security algorithm.

## SETUP CONSIDERATIONS

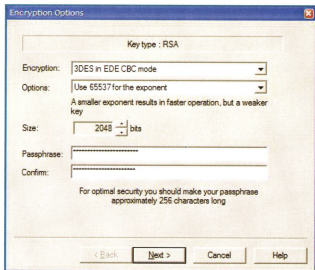
To access the home network, you need Internet access at both ends because VPN is a TCP/IP-based process. This means that you should have a permanent connection for the home network, whether it be permanent modem, ISDN or broadband. You also need a point of reference to connect to a static IP address or a hostname linked to a dynamic WAN IP address, or you must know what the WAN IP address is at any given time.

If the connecting machine is at your workplace, check with the network administrator to see if VPN tunnelling is permitted. Some companies have been known to block VPN traffic through their firewalls. Others block incoming VPN connections but not outgoing, and this won't cause any problems. If the connecting machine is a laptop, it needs some form of Internet access, such as a dialup service.

## IT'S IN THE WIZARD

There are some good software-based VPN solutions that handle multiple users and stronger encryption. However, Windows 2000 and XP both have the inbuilt ability to accept a single-user VPN connection.

Go to Network Connections in the Control Panel and select Make New Connection. In the wizard, select Set Up An Advanced Connection, and Accept Incoming Connections. Click Next, past



**Option step:** choose your own level of security and encryption.

the list of available devices, without selecting any. In the next screen, select Allow Virtual Private Connections, and then select the users who will be allowed to connect via VPN. In the Networking Component screen, select the protocols and clients that will be used over the VPN connection — TCP/IP should be ticked, as well as File and Print Sharing for access to resources on the network, and Client for Microsoft Networks for authentication.

To configure IP address settings for the VPN connection, select TCP/IP and click Properties. This screen allows you to specify whether you want incoming connections to access the local network (which should be ticked), and how it handles IP addressing.

Windows can assign an unused IP address using Dynamic Host Configuration Protocol (DHCP) — it assigns an address based on the IP address and subnet of the network interface accepting the incoming connection.

If you want to specify a range of IP addresses to assign, or prefer to assign IP addresses from a different scope (a different subnet, for example), you'll need to enter static IP values. Click Next and Finish, and the VPN service is ready to accept incoming connections.

This VPN connection uses PPTP as its tunnelling protocol, which operates on TCP port 1723. If you're using a broadband router to handle the Internet connection, you'll need to forward this port to the computer handling the VPN service. This port also needs to be opened on any active firewalls.

Also note that Windows 2000 and XP allow you to have only one VPN connection at a time.

## CLIENT HOOK-UP

Once the VPN service is running, you need to set up the client to connect to it. From the connecting machine, go to Network

► **Ready to roll:** importing WinGate's VPN config saves setup time.

Connections, Add New Connection. Select Connect to the network at my workplace, and then Virtual Private Connection.

If you're using a laptop, you will be asked whether the VPN connection should dial up the Internet through the modem first.

In the destination address, type in the WAN IP address or the hostname of the remote (home) network. Name the connection and that's it. Go back into the Network Connections and right-click on the VPN client connection. Select Properties and you can configure various options such as security, dialing choices and networking protocols (which should be unnecessary by default).

Double-click on the connection and you'll be prompted for a username and password. Provide the credentials of a user allowed to access the remote machine via VPN — authentication takes place by default using Microsoft Challenge Handshake Authentication Protocol (MSCHAP v2) — and a secure connection is established that enables you to access resources on the remote network.

To test the connection, ping the host computer or map to a shared resource.

## SOMETHING BEEFIER

It's quite secure to set up a VPN using inherent Windows technology. But if you want to transmit sensitive data and would like the reassurance of greater security, or you want to be able to connect multiple users to the VPN server, you'll need a third-party application.

Compatible with all versions of Windows, Deerfield's WinGate VPN ([www.wingatevpn.com](http://www.wingatevpn.com)) is a standalone application that incorporates a full firewall, Network Address Translation (NAT) filtering and highly secure VPN tunnelling using 128-bit encryption, X509 certificates and Secure Sockets Layer (SSL). Users of Unix platforms needn't feel left out, because Qlik's WinGate X ([www.wingatex.com](http://www.wingatex.com)) offers similar functionality.

Certificates are defined as encrypted public keys embedded into the VPN packet that the client and server machines use to identify each other when negotiating VPN connections. WinGate

► **Spelling it out:** the Windows wizard creates your VPN connection.

VPN also encrypts the tunnel data and the source/destination network addresses with 128-bit encryption and controls tunnel communication through SSL.

The installation process of WinGate prompts for a particular installation type: server, client or peer-to-peer. You should install the server first, review the configuration options during installation and then reboot the machine.

Once the machine has restarted, the WinGate engine starts automatically. Double-click on the tray icon to access GateKeeper, the configuration GUI. Click past the first screen and you'll be prompted to change the Admin password.

Under VPNs hosted, select Add a new VPN. Enter a name for the new VPN to be hosted and change Local Participation to Local Network.

On the next tab, generate your X509 certificate, which will be used by WinGate VPN clients to identify themselves to the server. You'll be presented with a number of security options. Triple DES is the standard encryption level offered — this takes the 56-bit Data Encryption Standard (DES) encryption key and encrypts the data three times using three different DES keys. It's slower than DES but much more secure.

International Data Encryption Algorithm (IDEA) is stronger than Triple DES and uses a true 128-bit key. The Size field relates to the size of the certificate's private key in bits. A larger size results in a more secure connection, but also decreased performance. A passphrase decrypts the private key — the longer it is (up to 128 characters), the higher the security.

The next tab gives users the option to enter geographical and business-related details into the certificate. Once these steps are

## Important negotiations

*The connection runs at the highest level of encryption that can be managed by the machine with the lowest encryption pack installed. If the server can manage 128-bit encryption but the client only 56-bit, the VPN connection will be negotiated down to 56-bit.*

*To ensure the strongest level of security, install the 128-bit encryption pack from Microsoft on both machines.*



complete, the certificate generates and the user is prompted to add users to the VPN. WinGate looks at the local users set up on the machine, and new users can be added directly within the application rather than going through Windows Management.

When you've finished, double-click on the newly created VPN to alter its properties, view the certificate details or change user access rights.

## ON THE PORT

At this point, the application alters its firewall settings to open up port 809, the port WinGate uses to accept incoming VPN connections. Again, if you have a broadband router, you'll need to forward this port to the server.


A double-click on VPN in the Miscellaneous window brings up a list of VPNs installed. Highlight the VPN you have just created and select Export Config. This allows you to save the VPN server configuration to file for use in setting up VPN clients.

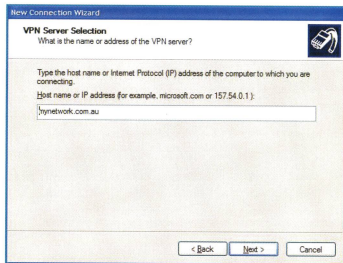
This is an important feature as the exported file contains the server details and passphrase in 32-bit SSL format. Save the export file to a floppy disk or a network location the client machine can access.

Run the installation package on the client machine, selecting the VPN Client installation option. Once you've done this, go into the GateKeeper GUI and double-click on VPN. Go to VPNs to join and select Import config. Browse to, and open, the export file — it imports all the necessary information for setting up the VPN client.

## END GAME

Now specify the username and password and you are almost finished. Simply right-click on the VPN tunnel in the main window and connect. The connection will establish and the connecting machine can view all of the resources available to the host.

And that's VPN in a nutshell. It's a great way to access your home network from almost anywhere — inexpensively and securely. 



▶ **No place like home:** enter the address of your domestic network.

## Hardening the artery

In a number of scenarios, a hardware VPN solution might be preferable to a software one. For example, in a small- to medium-sized business environment, if many simultaneous users are required, the resource drain on a machine through software VPN might be too much. Or you may feel uncomfortable exposing a home or office machine directly to the Internet and prefer to use a gateway device as a go-between.

If you have broadband Internet, there are some great all-in-one hardware devices that implement broadband connectivity, network address translation (NAT) routing, IP/MAC address filtering and VPN hosting in one package. They are affordable and highly recommended for home/SOHO networkers.

Some of the more popular packages include:

- Linksys BEFSX41 (supports 2 IPSec tunnels), \$175
- Netgear FV5318 (supports 8 IPSec tunnels), \$285
- D-Link DI-804V (supports 8 IPSec tunnels), \$290
- NetComm NB3200 (supports 70 IPSec tunnels), \$395
- SnapGear LITE (supports unlimited VPN tunnels), \$459

The advantage of these devices is that they handle all aspects of LAN/WAN connectivity, reducing traffic on the local network and freeing up backend system resources. Incoming VPN users can connect to any resource the router can see and is allowed to access.

If your requirements are somewhat heavier, here are a few hardware VPN/firewall routers that also support features such as triple DES data encryption and keyword content filtering:

- D-Link DFL-500 (also supports HTTP virus scanning), \$1,065
- SnapGear PRO+ (supports unlimited VPN tunnels), \$1,288
- Symantec Firewall/VPN 200, \$1,419

If a router is already in use and you don't fancy buying another, dedicated devices such as the SnapGear PCI630 NIC could be a good option (see our review in *APC* July, page 50). At \$579, it's more expensive than the entry-level routers and requires a machine to reside in, but it supports up to 40 VPN users, is firewallled and inflicts no resource drain on its host.

For a business, having a dedicated VPN device such as the PCI630 in between the router and the LAN represents an extra layer of security between the Internet and the local network.

The PCI630 supports NAT and can connect two separate networks, allowing for the creation of a "buffer" subnet to keep the hardware router and the local network separate both physically and logically.

The main advantage of hardware VPN solutions is that they provide independence from operating systems and multiple hardware components. A software VPN server can be taken out of action by a faulty hard drive, memory leaks or application crashes, whereas a VPN device has to rely only on its own hardware and IOS. This vastly reduces the scope for problems and downtime.

# Unbeatable Performance

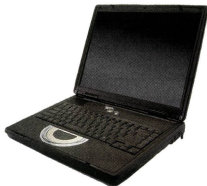
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# File-system soup

## FAT16, FAT32, NTFS... Serdar Yegulalp sorts out file-system confusion and delves into WinFS.

Each revision of Windows delivers new features, new foibles and it often seems, new file systems — the way the OS catalogues and organises information on the hard drive. The file systems in Windows, FAT, FAT32 and NTFS each do this a little differently.

One of their common traits is the physical division of the hard disk into clusters, where each piece of a file resides. Files larger than a single cluster are broken up and spread across as many clusters as needed; files smaller than the cluster occupy it exclusively, so there's never more than one file (or a part of one file) per cluster.

### CLUSTER BUSTER

The original File Allocation Table (FAT) system was primarily designed for floppies. FAT employs a table (also known as a volume bitmap) that indicates which clusters of the disk are allocated to which files. This method best suits the disk sizes that people dealt with in the early days of DOS — floppy disks which maxed out at 1.44MB, or for the lucky and well-heeled few, a 10MB hard drive.

But as hard disks grew in popularity and capacity, the limitations of FAT — short filenames, weak error-correction and inability to address large volumes — became burdensome.

One of the first changes to FAT upped the size of the table's pointer to each file from 12 to 16 bytes. The largest partition size possible under FAT16 is around 2GB. FAT's clusters can be anywhere from 512 bytes to 32KB, depending on the size of the volume — drives over 1.2GB are set to 32KB clusters.

This leads to one of the inherent problems of a large cluster: a file smaller than the cluster results in "slack" space. For example, a 2KB file occupies an entire 32KB cluster, so 30KB remains empty yet unavailable to other files. And while a 35KB file occupies all of one cluster, it needs only 3KB of the next, so 29KB are wasted.

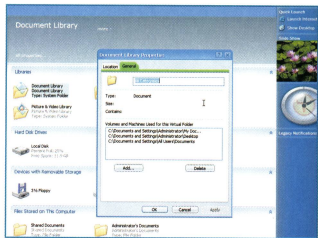
FAT16 adds some degree of error-correction by keeping two updated copies of the volume bitmap in different places on the disk. If one runs awry, the other can be used. Sometimes there is no way to tell which of the two is damaged, making FAT12 and FAT16 disks prone to failure.

Until recently, FAT16 served many people well. It's still widely used on small removable media such as floppy disks, since the file system's internal structures (directory information, boot data, and so on) are very compact. If you format a floppy in Windows 2000 or XP, the only option you're given is FAT16.

Many system gurus advise having at least one FAT16-bootable partition on a multipartition system, since many non-Windows (and non-DOS) rescue programs can read it transparently.

### CHEWING THE FAT

The FAT file system's next overhaul came early in the life of the Windows 9x line, with the debut of FAT32 in late 1996. Although FAT



**Peeking through new Windows:** this preview of Longhorn shows how WinFS allows documents stored inside the database to be sorted into libraries and virtual folders.

32 is built into the OEM Service Release 2 (OSR2) of Windows 95 (also known as Windows 95b), distribution of this non-retail build was restricted to new PCs and key components such as motherboards. It wasn't until Windows 98 that users started taking notice.

FAT32 is a rewrite of FAT16 which ropes off 32 bytes for addressing, although only 28 are used (the upper 4 bits of each table entry were reserved for the system). Cluster sizes drop from FAT16's maximum 32KB to a more efficient 4KB, which makes for less wastage — a 2KB file leaves only 2KB in limbo, compared to 30KB under FAT16. As a result, converting a hard drive from FAT16 to FAT32 immediately results in more usable storage space.

Saving a few kilobytes may sound trivial, but efficient cluster sizing is critical on a volume with thousands of files. This is why FAT32 is better for volumes over 2GB.

The downside is that the size of the allocation table in FAT32 is 16 times larger than in FAT16, which is one reason why FAT32 isn't recommended on partitions smaller than a few hundred megabytes. It's also another point in favour of NTFS for much bigger drives.

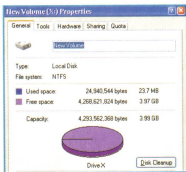
FAT32 partitions can theoretically scale up to 2 terabytes in size, although Windows supports FAT32 partitions up to only 32GB. Also, single files on a FAT32 partition are limited to 4GB.

Microsoft also used FAT32 to make files searchable based on their content. FAT32 allows for a content-indexing system that constructs searchable indices of the entire hard drive.

But this solution is far from perfect. The background indexing process inflicts a substantial performance penalty on the machine, while the indices themselves demand plenty of space.

The many incremental changes to the FAT-based file system were strong on backward compatibility with earlier versions of Windows

► **Blank slate:** this freshly formatted NTFS volume of 4GB shows almost 24MB roped off for the Master File Table.



9x, but it was clear that FAT was a dead end. The development of Windows NT allowed Microsoft to radically overhaul the OS from the ground up, including the foundation file system. NTFS (NT File System) was designed for scalability on large partitions, security, error correction, recovery and plenty more, and NTFS remains the primary file system for Windows XP.

Like FAT, NTFS allocates partition space using clusters, but the size and number of clusters are highly flexible. A single NTFS volume can hold up to 16 billion gigabytes, and any one file can be as large as the entire volume. What's more, cluster sizes (and slack space) on big volumes can be kept to a minimum, since NTFS uses a 64-bit addressing scheme.

In several other ways, NTFS is built a little differently to FAT. All NTFS file structures — including directory listings and the Master File Table (MFT) itself — are stored as metadata files.

Because the MFT is a file, it can grow as needed. When an NTFS volume is created, 12.5% of the disk space immediately following the MFT is set aside to allow the MFT to expand (this also keeps it from fragmenting). This reserved space means that NTFS file structures take up more disk space than other file systems, although that's of little concern because NTFS should really be used only on larger partitions.

Each NTFS file is a collection of attributes — name, date last accessed, access permissions, plus the data itself. This way the file system itself can be expanded on and revised (as it already has been) without destroying backwards compatibility.

Maintaining all this additional metadata makes NTFS slower than other file systems, as does the overhead of checking security information each time a file is accessed. However, some of this can be worked around by disabling some Windows defaults, and it's important to remember that the speed and size trade-off for using NTFS is minuscule compared to the stability it provides over all forms of FAT, especially when dealing with today's large hard drives (and any partition bigger than 4GB).

However, if you sat down to design a file system today, it'd do several things differently to NTFS. You'd probably do away with using letters to label hard drives — a holdover from the DOS era. You might want more flexible partitions. Faced with massive hard drives and millions of files in all manner of formats — including documents, pictures, audio and video — you'd certainly want indexing and searching that's both fast and thorough. And that's exactly the thinking behind the Windows Future Storage or WinFS file system.

## WINFS REINCARNATE

None of the notions behind WinFS are particularly new. Its roots can be traced back a full decade to Redmond's superset of future OS technologies known as Cairo, where it was tagged as the Object File System (OFS). Several elements of Cairo evolved into the Windows we know today: the user shell was introduced in Windows 95, and Active Directory in Windows 2000.

Now the ideas behind OFS are ready for a reincarnation as WinFS, which is expected to arrive with the Longhorn Windows desktop OS in 2005.

WinFS borrows several existing ideas and melds them into a new whole. From NTFS it takes the idea of every structure in the file system being a file unto itself. The implementation is totally different, however: WinFS uses the data-structuring technology found in Microsoft's SQL Server (and a file system is a database, after all) to allow data to be cross-indexed and analysed in ways not previously possible.

For example, instead of maintaining a single directory for all files, WinFS runs multiple directories that are cross-indexed — for example, in addition to the standard directory of filenames for MP3s, there's a directory of MP3 metadata (such as artist and title) which can be searched. The cornerstone is another hand-me-down from NTFS — "attributes" or file-descriptive metadata which is flexible and can be redefined for any file type.

This should make searching and sorting far easier, and because all the files are represented as entries in a database, there's no need for conventions such as folders or even drive letters. Folders will still be available if users desire (and most will), and many pre-Longhorn applications will also expect to see drive letters and directories, so these will be applied through a "service" layer. But power users and applications written exclusively for Longhorn will be able to directly plumb the depths of WinFS. [EUIE](#)

## Lose that FAT

What if you're using FAT32 and want to move to NTFS? Microsoft provides a tool in Windows 2000 and XP for converting FAT16 and FAT32 partitions to NTFS. But the aptly named *Convert utility*, which must be run from a command box (use "help convert" to determine switches and syntax), isn't the best way to make the change.

The cluster sizes for a given FAT32 partition may not be optimal for a similarly-sized NTFS partition, resulting in wasted space, and the conversion process seriously fragments the file system.

We recommend copying data off the drive or partition and then reformatting it as NTFS, since this allows the NTFS structures and cluster sizes to be created from scratch to fit the partition rather than be inherited from FAT32.

However, there are also ways to manipulate FAT and NTFS partitions without reformatting. The simulation mode of *Ranish Partition Manager* ([www.ranish.com/part](http://www.ranish.com/part)) lets you test the results of resizing before committing the changes. *Partition Resizer* ([www.zelebs.com](http://www.zelebs.com)), *BootIt Next Generation* ([www.terabyteunlimited.com](http://www.terabyteunlimited.com)) and *Partition Manager 5.5* ([www.paragon-lan-net.com.au](http://www.paragon-lan-net.com.au)) are also worth a look.





# Befriending the natives

**Windows is hardly known for its support of other file systems. Paul Robinson shows how to add a few to its repertoire.**

Viewing Linux partitions from Windows? That's crazy talk. NTFS on Windows 9x? Yeah, right. Until recently you'd be laughed at for even contemplating such a venture, as Windows lags far behind Linux in its support of other file systems. This has left dual-boot users staring at their POST screens so often that it's burnt into their retinas.

Thankfully, there are now a few products on the market that act as middlemen in this "under the table" transaction of data. To prove it, specialist in disk utilities Paragon ([www.paragon.lan-net.com.au](http://www.paragon.lan-net.com.au)) has released Ext2FS Anywhere and NTFS for Win98.

Both tools make the configuration of new partitions a snap, with the ability to add, mount and remove partitions from a number of non-natively supported operating systems. They also hide partitions so they can't be recognised and booted by the BIOS — a handy trick.

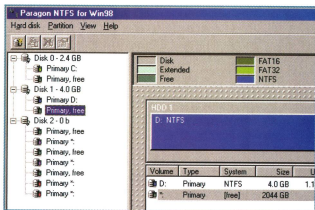
It's important to note that these tools provide Windows 9x access only to other partition types and don't allow you to convert your system drive (usually C:) to NTFS or Ext3. They can, however, create partitions of these types using the free space available.

Rebooting to use the other OS is still required, although programs such as these remove the need to reboot back into the first OS should you forget to copy across a required file.

Ext2FS Anywhere provides read and write access to Ext2 and Ext3 partitions under all versions of Windows, from 95 through to XP. This software makes it easy to add Linux partitions, and it also supports HPFS and recognises invalid (corrupt) partitions.

To add a Linux partition, make a selection from the list of drives and partitions displayed on the left side of the window. Once a partition or drive is selected, a graphical representation of the drive's configuration is presented — much like the disk manager of Win2k or XP. Used space is shaded and the different partition types are colour-coded using the key at the top of the screen.

Once a partition has been selected, right-click on it and choose Mount. It will then ask if you want to assign a drive letter. A drive letter must be selected to mount the partition. Partitions are



► **Up to speed:** even Windows 98 can have access to the latest file systems.

unmounted by selecting the "Do not assign drive letter" option. Windows 9x requires a reboot due to its lack of dynamic drive mounting, but once this is done the Linux partition will be available.

You can now use the partition as a normal Windows drive, although we recommend that you disable the Recycle Bin functionality. It's not recommended for maintenance or recovery work, and a dedicated recovery distro or the standard Linux suite of tools are far better for this task. It does, however, make sharing files between the two OSes far more seamless from the Microsoft side.

A few settings can be changed by the power user to solve configuration problems, such as trying to access non-BIOS cylinders and enabling non-standard ReiserFS cluster sizes.

It's a similar story for Windows 9x users who need access to NTFS partitions. While it is possible to install Win2k/XP on a FAT32 system, the inherent security and file integrity benefits of NTFS mean that most users that dual boot have separate partitions for each OS.

NTFS for Win98 installs with minimal fuss, although a customary reboot is required. Due to Win9x's lack of dynamic mounting, all recognised partitions (including Linux if bundled with Ext2FS) are mounted at boot time and the mount option is missing for this platform. As with Ext2FS, it's advisable to turn off the Recycle Bin support. [www.paragon.com.au](http://www.paragon.com.au)

OS	FileSystem	FAT16	FAT32	NTFS	ext2	ext3	ReiserFS	hpfs
Windows 9x		x	95b or later	NTFS for Win98	Ext2FS Anywhere	Ext2FS Anywhere	N/S	N/S
Windows Me		x	x	NTFS for Win98	Ext2FS Anywhere	Ext2FS Anywhere	N/S	N/S
Windows NT		x	N/S	x	Ext2FS Anywhere	Ext2FS Anywhere	N/S	NT 3.1 — 3.51 only
Windows 2000		x	x	x	Ext2FS Anywhere	Ext2FS Anywhere	N/S	N/S
Windows XP		x	x	x	Ext2FS Anywhere	Ext2FS Anywhere	N/S	N/S
Linux (2.0.x kernel)		x	x	N/S	x	N/S	N/S	x
Linux (2.2.x kernel)		x	x	x	x	kernel patch	x	x
Linux (2.4.x kernel)		x	x	x	x	x	x	x
OS/2		x	N/S	N/S	N/S	N/S	N/S	x

x = supported natively N/S = not supported

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# Under lock and key

## The secrets of system-level encryption in Windows 2000 and XP, revealed by Serdar Yegulalp.

Everyone has secrets worth keeping. On a PC, those secrets deserve the best possible protection from prying eyes — whether it's an appointment diary, work blueprints, bank account information or email archives. People have used codes, ciphers and encryption to protect information for centuries, and you can do the same with Windows 2000 and XP.

Casually encrypting and protecting computer-based data has become a lot easier due to the recent explosion in CPU power. Files that took minutes to encrypt can now be protected in under a second. What's more, Windows has its own built-in encryption systems — perhaps not the most robust, but easy to use and tightly woven into many aspects of the OS.

Windows encrypts a file by using two key ingredients: the user's account password and a cryptographic certificate generated for that user. The certificate is used in conjunction with the data to be encrypted; since each user's certificate is unique, the results differ from user to user, even if the exact same data is encrypted.

### TALES FROM DECRYPT

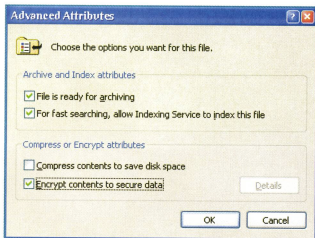
The first and most obvious way Windows uses encryption is in the file system. Files stored on NTFS volumes can be encrypted so only the user who encrypted them can decrypt them.

To encrypt a file or folder, right-click on the object, select Properties and Advanced, and check Encrypt contents to secure the data. To decrypt the file, uncheck the box.

If you encrypt a folder, the system will prompt you on handling future encryption — that is, if everything placed in

that folder from now on is to be encrypted or not. Note that you can't both encrypt and compress a file using NTFS ondisk compression.

Once a file is encrypted, click the Details button to learn more about who can access the file. Windows allows you to add access to an encrypted file on a user-by-user basis, so multiple users on the same



► **Nice attributes:** encrypting a file is as easy as checking the appropriate box. To decrypt, just uncheck.

machine (or in the same domain if you're using Windows 2000 domains) can open the object.

If you're using recovery policies in the domain, any data recovery agents for the file will also be listed (these are backup accounts that contain certificates that can be used to recover encrypted data — but not the encryption keys themselves).

A file which has been encrypted in Windows can't be moved to another non-NTFS volume without losing its encryption.

### VESTAL VIRGINS

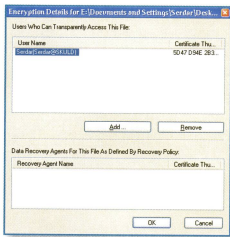
Commonsense password procedures are one of the most important ways to use encryption well. Never use a word that can be guessed, a birthday or some other form of personally identifiable information.

It's best to use a combination of letters and numbers that means something only to you. You might take a favourite line from a song and use the first letter of each word. "Sixteen vestal virgins leaving for the coast" becomes 16vvllvc — cryptographically secure and virtually impossible to guess.

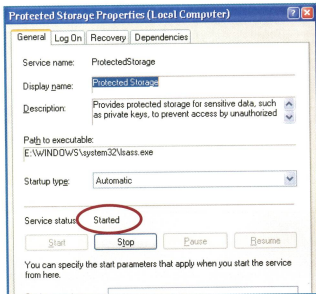
If you forget your system password, be warned that changing it destroys all existing encryption certificates and stored passwords for Web sites. When you set up a password in XP, a hint option lets you add a phrase to jog your memory. If you haven't set up a phrase already, do so now. The password you save may be your own.

If you're *really* stuck, you can recover the account at the expense of encrypted material. XP Home has an Administrator user account available only in Safe Mode. Generally this account has no password, so you can restart in Safe Mode (press F8 at boot time), log in using Administrator as the account name, and then change another user's password via the Control Panel.

You can do the same thing in Windows 2000 by logging in as Administrator and changing passwords in the Local Users and



► **The x-files:** individual users domain-wide can be granted or denied access to encrypted files.



► **Protected Storage:** holds confidential data IE uses. Make sure it's running if experiencing problems with forms or passwords.

Groups console — unless it's the Administrator account you've lost the password to. If that's the case, consider a third-party product like Password's Lost Password Recovery Disk ([www.lostpassword.com](http://www.lostpassword.com)). Password also has tools for recovering passwords from tonnes of third-party Windows programs, not just Windows itself.

Nothing is uncrackable, and certainly not Windows' file system encryption. The makers of Elcomsoft's Advanced EFS Data Recovery claims it can decrypt EFS files, even when keys have been damaged or lost. You can download a free trial version from [www.crackpassword.com/products/prs/others/efs/](http://www.crackpassword.com/products/prs/others/efs/) and check out just how vulnerable your data is.

## SENSITIVE DATA

Another way Windows uses encryption is in the Protected Storage Service (PSS). It holds passwords and AutoComplete form data used by Internet Explorer. A lot of this data is sensitive, which is why it's kept under digital lock and key.

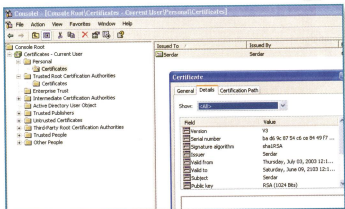
If passwords and AutoComplete don't seem to be working, there's a chance the PSS has stopped. Check it's running and set it to Automatic in the Services section of the Computer Management console.

Are the PSS contents always off-limits? Actually, they aren't. With the right software, Protected Storage can be just as much of an open book as any non-encrypted file. Last Bit Software's Secret Explorer (<http://lastbit.com/wse/default.asp>) graphically explores the contents of Protected Storage, and even import or export the contents from one computer to another.

## CERTIFIED SAFE

Yet another area where Windows employs encryption is in the use of browser certificates, usually provided by sites that use the HTTPS protocol for encrypted data.

Ecommerce sites — Amazon, for example — use SSL to transmit and receive credit card information. The certificates used by Web sites for SSL are stored in your Web browser and can be viewed by selecting Internet Options from the Control Panel, then



► **Internet Options:** the Microsoft Management Console's Certificates snap-in gives you access to all the certificates in your system.

Content, Certificates.

To clear out the SSL certificate cache, click the Clear SSL State button under the Content tab. This process ensures that any future visits to a site that uses SSL will download a fresh copy of the certificate. This is useful if you find out that a site has changed its certificates and you're using an older, cached (or even expired) certificate that produces errors.

To see the entire certificate store, type **mmc** from a Command line or the Start, Run dialog box, then press Ctrl-M and click Add to add a snap-in. Choose the Certificates snap-in and set it to My user account. This adds a tree of certificates organised by type.

If you don't see a certificate under Personal, one hasn't been generated yet. As soon as you create an encrypted file or perform some other certificate-generating action, one will be created on-the-fly.

The Action menu lets you import or export certificates to and from a given folder — useful if you want to back up your existing encrypted certificates to a file. In the event of a disaster, you can reimport them and recover encrypted data, provided you still have the same user password. [\[TIP\]](#)

## Third-party privacy

If Windows' built-in encryption isn't strong enough for your needs, consider some third-party products. One of the most prevalent and powerful encryption programs is the aptly named Pretty Good Privacy, from the PGP Corporation ([www.pgp.com](http://www.pgp.com)). Its Personal 8.0 product (US\$50) encrypts email, files and instant messages, and can also create transparently encrypted disk volumes which stay hidden when not in use. PGP no longer offers a freeware version of its product due to US export restrictions and other laws.

Hardcore experts will be interested in the GnuPG product ([www.gnupg.org](http://www.gnupg.org)), a free and open source derivative of the old PGP line. There's no GUI here — it's all command line driven — but for those that can manage it, it's a powerful way to encrypt files and email.

For simple file encryption, WinZip now supports AES-128 encryption, a nice step-up from its previous (and vulnerable) ciphers. Also, Office XP has the ability to protect its own files using RC4 cryptography from a choice of many algorithms.





# Penguin playtime

**Moving from Windows to Linux doesn't mean a life without gaming. Paul Robinson explains.**

You may think gaming on Linux is restricted to mah-jong and Tux Racer, and to play mainstream games you need a dual-boot system. While that was true a few years ago, game developers are now supporting Linux at an ever increasing level.

Doom III will be released on Linux at the same time as other platforms. Other games, such as Max Payne, can be played only via third-party interpreters, including TransGaming's WineX ([www.transgaming.com](http://www.transgaming.com)).

Linux game developer Loki offered ported versions of Windows games including Civilization: Call to Power, but the company closed down in January 2002 due to poor sales. This illustrates the main hurdle for Linux gaming companies: there just aren't enough users yet to support companies with traditional business strategies.

## ENABLING DRI

The lack of an API similar to DirectX has been holding back Linux game development, although the Direct Rendering Infrastructure has helped. DRI, a framework allowing safe and efficient direct access to graphics hardware, changes many aspects of Linux including the X server and the kernel.

Its first major use has been the creation of fast OpenGL implementations — a key requirement for nVidia and ATI drivers that support 3D rendering.

DRI needs at least a 4.0 release of the Xfree86 GUI along with the 2.4.0 kernel or higher, and both are available on most recent distros. If you don't have DRI installed or need to upgrade, head to <http://dri.sourceforge.net> to download the latest version, or get it from our cover CD set this month.

To test if your system is DRI-enabled, open a terminal window and run:

```
glxinfo
```

The key lines to look for will be something like this:

```
direct rendering: Yes
```

```
and
```

```
OpenGL vendor string: NVIDIA Corporation
OpenGL renderer string: GeForce3/AGP/SSE/3DNOW!
OpenGL version string: 1.4.0 NVIDIA 43.63
```

This shows whether DRI is enabled and which renderer and OpenGL vendor it is using. If the report is that direct rendering is not enabled, download and install the latest drivers from the site of your card vendor.



▶ **Target market:** *Unreal Tournament 2003 is one of many games ported to Linux.*

## DRIVER REVIVER

Installing the latest vendor drivers is a crucial step for any game player. Windows users have always enjoyed a relatively simple method of installing drivers, and now Linux users share a similar level of ease. The latest drivers for nVidia and ATI are on this month's cover CD set.

At first glance nVidia's installation looks more complicated than for ATI's Red Hat Package Manager (RPM). But it's actually the more flexible of the two because nVidia no longer relies on the RPM system, which means it works well on all Linux distros.

Before beginning the driver installation, exit the X server and set the default run level to 3 so the system will boot to a VGA console, and not into X, by modifying the `/etc/inittab` file. This can be set back to 5 once everything is up and running, but this lower setting makes recovery easier if there's a problem during installation.

The nVidia driver installation can begin by executing:

```
sh NVIDIA-Linux-x86-1.0-4363.run
```

The nVidia kernel module has an interface layer that must be compiled specifically for the kernel's configuration and version. The installation file contains the source code to this layer and precompiled versions for many of the kernels distributed by popular distros. For this reason, it's recommended that you have your kernel's source installed on your system.

When the installer runs, it checks to see if it has a precompiled kernel interface for the installed kernel bundled in the installer and also on the nVidia Web site. If a precompiled kernel interface is found that matches yours, it'll be linked to the precompiled portion of the nVidia kernel module.



If no matching interface is found, the installer compiles the kernel interface for you.

Before the newly installed driver can be used, the XF86Config file (in /etc/X11/) must be modified. Find the Device section and change the Driver name from "nv" or "vesa" to "nvidia". In the Module section, make sure you have:

Load "glx"

and that these two lines are removed:

Load "dri"

Load "GLcore"

ATI's drivers are far easier to install, but they work only on systems that support RPMs. To install the ATI drivers simply run:

`rpm -iv filename`

where the `filename` is either `fglrx-glc22-4.1.0-2.5.1.i586.rpm` or `fglrx-glc22-4.2.0-2.5.1.i586.rpm` depending on which version of Xfree86 is installed. Then restart the X server.

## GET YOUR GAME ON

Now that the Linux system has 3D support enabled, it's ready for the latest games. There are plenty of community and open source games, but they generally don't compare to Windows' visually enhanced games that make full use of graphics cards.

That said, there are game sites worth bookmarking. A few to visit include [www.happypenguin.org](http://www.happypenguin.org), [www.linuxgames.com](http://www.linuxgames.com) and [www.tuxgames.com](http://www.tuxgames.com).

Installation of Linux titles is almost always a case of either installing an RPM or running an installation script, much like the nVidia drivers outlined earlier.

Traditionally, the majority of the popular titles ship for the Windows platform first and Linux versions are released as an afterthought. This has resulted in two kinds of solution: those that port Windows versions of games to Linux versions; and those that develop Windows compatibility interfaces such as WineX.

## HARD TO PORT

Ported releases come as either completely separate or as a downloadable Linux front end that uses the Windows CD for data files.

The best possible option is when game vendors invest the time and resources to port their titles to the Linux environment right off the bat. This often results in a better quality of final product due to their intimate knowledge of the game.

You can also get the Quake III and Unreal Tournament demos

from this month's cover CD set onto your system by running:

`sh linuxq3demo-1.11-6.x86.gz.sh`

or

`sh UT2003-Demo-Linux.sh.bin`

## BEYOND WINE

After Loki, TransGaming adopted a different business model to provide mainstream games for Linux. Its flagship product, WineX, a branch of the Wine open source Windows emulator, is supplied on a continually updated basis. Unlike Wine, WineX supports OpenGL and DirectX-dependant apps. OpenGL calls pass directly to the underlying Linux OpenGL, improving performance because WineX has to interpret any DirectX instructions. Always try to use OpenGL/hardware drivers in games for the closest to native performance.

WineX installation is simple thanks to its RPM packaging. Once complete, you can start loading Windows-based games. Assuming the setup files are on a CD, they can be loaded, for example, with:

`wineX3 /mnt/cdrom/setup.exe`

After installing as if on a Windows PC, the games executable can be found under the TransGaming directory in your home folder.

WineX's developers are constantly tweaking the software, hence its subscription-based business model. Even if the software doesn't support the latest game 100%, a quick visit to TransGaming's site often results in an update with improved support. <http://www.transgaming.com>

## Gentoo revolution

*With minimal pomp, May 15 2003 marked the beginning of Gentoo Games and what could become a revolution in Linux's involvement in computer gaming. Gentoo Linux's developers formed the company to offer platform-independent gaming based on Gentoo GameCD technology.*

*The results of this venture are bootable game CDs, with Gentoo Linux at the core, that turn any Windows- or Linux-based PC with an ATI or nVidia graphics card into a gaming console.*

*The user simply places the disc into the PC's CD drive and reboots. GameCD technology takes care of hardware auto-detection and configuration, and loads the game with minimal fuss.*

*Two titles are available at the Web site [www.gentoogames.com](http://www.gentoogames.com). America's Army, the first title released by this method, was quickly followed by Return to Castle Wolfenstein: Enemy Territory. However, there have since been no further releases.*



# Turning the tables

Setting up a packet-filtering firewall to share an Internet connection under Linux sounds difficult, but, as Jarrod Spiga demonstrates, it can be simplified.

Built in to the Linux kernel are tables responsible for packet-filtering. They examine the headers of network packets as they enter, pass through, and exit interfaces, and make decisions on what to do with a packet based on those observations. From the Linux v2.4 kernel and onward, packet filters are set up using the iptables tool.

Linux is renowned for performing well — even on dated hardware — and that dusty old Pentium 133 can actually be made useful again as an Internet connection-sharing router with firewall.

This Workshop is in two sections: the first explains how to work with tables, chains and rules; the second extends the concepts to accommodate IP Masquerading (IPMASQ) and Network Address Translation (NAT) features.

## IPTABLES 101

The Linux kernel contains numerous packet-filtering tables, which the iptables tool can manipulate in order to restrict what packets make it to, or are forwarded by, the Linux host.

Because these tables are stored in the kernel, any changes you make to them are lost on reboot. For this reason, shell scripts are usually written containing the commands used to build the firewall. The script is usually set to run on startup, but quick or temporary changes can be made by issuing commands via a command line interface.

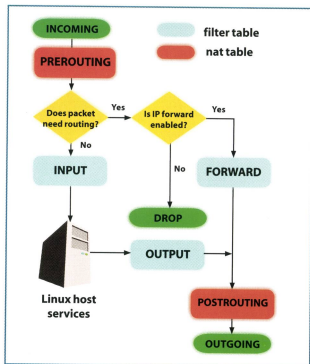
Each table consists of a number of chains. When a packet reaches specified locations in the network interface, a chain is processed. Each chain consists of a number of rules, against which each packet is compared.

The diagram (above right) deals with the filter table that consists of three non-removable, pre-defined chains. The INPUT chain is processed before a packet arrives at services running on the local system. If the packet is to be routed to another host, the FORWARD chain is processed (assuming IP forwarding is enabled). The OUTPUT chain is processed when a packet is sent out from a service running on the local system.

This diagram also includes a nat table. It shows two pre-defined chains that help out with routing tasks before and after they are passed through the filter table, called PREROUTING and POSTROUTING respectively.

A rule is made up of a filter specification and a target. If a packet's header matches the filter specification, the target is then processed. Rules in a chain are processed in order, and if a packet doesn't match any of the rules in a chain, its default security policy is applied.

Unless otherwise specified, all pre-defined chains are set to ACCEPT packets by default. The first rule in a chain is labelled 1, the second 2, and so forth.



► **Chain reactions:** as a packet moves through a networking interface, different chains are processed.

## MAKE THOSE SYSTEMS PING

Assuming there's no existing firewalling, you should be able to ping your system's loopback interface once by doing the following:

```
# ping -c 1 127.0.0.1
PING 127.0.0.1 (127.0.0.1): 56 data bytes
64 bytes from 127.0.0.1: icmp_seq=0 ttl=64 time=0.1 ms

--- 127.0.0.1 ping statistics ---
1 packets transmitted, 1 packets received, 0% packet loss
round-trip min/avg/max = 0.1/0.1/0.1 ms
```

If you didn't want your loopback interface to reply to pings, there are two options: either stop the ping from before it arrives at the loopback interface, or stop the reply leaving the loopback interface. In this case, it makes more sense to do the former.

The operation to perform is to append a rule to the INPUT chain (-A INPUT). The filter specification should match packets using the ICMP protocol (-p icmp) with a destination address of 127.0.0.1 (-d 127.0.0.1). Any packet matching the filter will be dropped (-j DROP). Thus, the command to enter is as follows (take



► **Home delivery:** the Linux host shares the Internet connection for the rest of a typical home network.

note that iptables modifies the filter table by default, so there's no need to specify it):

```
# iptables -A INPUT -p icmp -d 127.0.0.1 -j DROP
```

To test this, send another ping to the loopback interface:

```
# ping -c 1 127.0.0.1
PING 127.0.0.1 (127.0.0.1): 56 data bytes
```

```
--- 127.0.0.1 ping statistics ---
1 packets transmitted, 0 packets received, 100% packet loss
```

Referring to the diagram on page 132, the ping came from the Linux host, and passed through the OUTPUT chain. As this chain is empty, the default ACCEPT policy is adhered to. The packet then leaves the interface (there's no need to worry about nat table elements in this case). The packet then arrives on the loopback interface; it doesn't need to be routed elsewhere.

Now the INPUT chain is processed. The packet matches the first and only rule, and is dropped. It's worth noting this only filters ICMP packets — any TCP- or UDP-based communications are permitted.

Deleting the rule can be done in three ways. If the rule number is known, implicit deletion is done by using the command:

```
iptables -D INPUT 1
```

If some or all of the details about the rule are known, delete it by entering as many of the details as possible. Importantly, if there are multiple rules that match the criteria specified, only the first of those rules will be deleted. The syntax is:

```
iptables -D INPUT -p icmp -d 127.0.0.1 -j DROP
```

Alternatively, flush the whole chain:

```
iptables -F INPUT
```

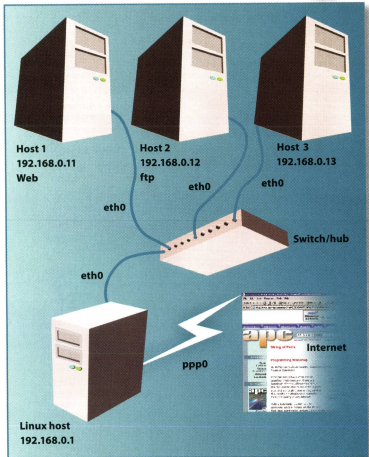
## THE CHAINS THAT BIND

All pre-defined chains have a default policy of accepting packets. This is less than desirable because a firewall should be designed by blocking all access and then opening up only what is required. You can change this default policy using the `-P` operation as follows:

```
iptables -P <INPUT/OUTPUT/FORWARD> DROP
```

Setting a chain's default policy to `DROP` will always drop a packet if it's not accepted by a matching rule in the chain. By omitting a chain name, all pre-defined chains will have the policy applied to them.

If you have a set of rules that apply to many conditions, including these rules in a custom chain will improve the modularity of your firewall. Custom chains are processed when listed as the target in a rule. These are created as follows:



```
iptables -N foo
```

where `foo` is the name of our custom chain. Issuing this command removes an empty chain:

```
iptables -X foo
```

## FILTER SPECIFICATIONS

Accurate filter specifications determine how well a packet-filtering firewall operates, because if the filters contained within the rules don't match the packets you receive, packets won't be processed (and will be dropped if the default chain policy is changed).

The basic assumption to make when creating rules is that if a certain filter element is left out, all packets will match that element.

The most commonly used elements are the address options.

There are two types: source address (using the `-s` switch) and destination address (using the `-d` switch).

There are also several ways to specify matching addresses in your filter. In the ping demonstration, a single IP address is used (127.0.0.1). Subnet or significant bit notation can be used to express IP ranges. For example, both 192.168.0.0/255.255.255.0 and 192.168.0.0/24 refer to all addresses between 192.168.0.0 and 192.168.0.255. The last way to specify an address is via a fully-qualified domain name, such as `www.apcmag.com`. This isn't recommended, as a time consuming DNS lookup will occur when the rule is checked.

To block packets coming from 207.46.249.27, enter:





```
iptables -A INPUT -s 207.46.249.27 -j DROP
```

The interface element is also commonly used. Imagine a Linux box connected to the Internet via a dialup or ADSL connection on `ppp0`. As most ADSL and dialup providers assign IP addresses to the network interface, the script won't be aware of which address has been assigned. By using the `-i ppp0` element, any packets arriving specifically on `ppp0` are matched. Logically, the `-i` switch can only be used on INPUT, FORWARD and PREROUTING chains — outbound chains won't process data coming into interfaces. For the same reason, the `-o` outgoing switch can only be used on OUTPUT, FORWARD, and POSTROUTING chains.

To specify all Point-to-Point Protocol interfaces, use `ppp+` after the switch. To stop your Linux PC from communicating with 207.46.249.27 via `ppp0`, enter:

```
iptables -A OUTPUT -d 207.46.249.27 -o ppp0 -j DROP
```

The protocol element is commonly used in order to block types of traffic. They are a pre-requisite for being able to block connections on certain ports. The ping demonstration shows how to block all ICMP traffic, but it can also block the TCP or UDP traffic protocols using the `-p` switch.

Once the TCP or UDP protocol has been specified in the filter, further definitions can be added by defining what port(s) the packets are transferred on. To block connections from your Linux host to port 80 on 207.46.249.27, use:

```
iptables -A OUTPUT -d 207.46.249.27 -p tcp --destination-port 80 -j DROP
```

To specify a source port number, one would use the `--source-port` switch. A full list of the common filter specifications can be found in the `iptables` cheat sheet on the cover CD set.

## IPTABLES 102

NAT refers to the translation of an IP address from one network address to another on a different network. The second diagram (page 133) shows a network similar to that of many home users. All four hosts have interfaces on the internal network configured with IP addresses in the private IP range. The Linux host acts as the gateway, sharing the Internet connection for the internal hosts.

Because devices with private IP addresses can't communicate directly with the Internet, the gateway needs to modify the source IP address field on outbound packets to be the same IP that is assigned to the external interface on the gateway. This is called Source NAT (SNAT).

The other form of NAT is called Destination NAT (DNAT). This is where the destination field of a packet is modified in order for that packet to reach its destination. Referring to the second diagram, Host 1 is running a Web server. To allow Internet hosts to contact it, the gateway must perform DNAT on all requests coming in to port 80, modifying the destination address to the IP address of the internal host. This specific form of DNAT is called Port Forwarding.

In order to set up any form of NAT, IP Forwarding must be enabled in the kernel. Including the following lines in a firewall script will do this, along with installing the necessary module for NAT:

```
echo 1 > /proc/sys/net/ipv4/ip_forward
/sbin/modprobe iptable_nat
```

With all NAT-based packet-filtering rules, you need to specify the use of the `nat` table in the rule, and not the filter table.

The `nat` table contains two pre-defined chains titled PREROUTING and POSTROUTING. Referring back to the first diagram (page 132), these chains are run before and after routing on the packet is processed. Logically, SNAT can only be done in the POSTROUTING chain, while DNAT can only be used in PREROUTING.

If the Internet interface has an IP address assigned to it from your ISP, a specialised form of SNAT — IP Masquerading — needs to be used. This can be set up in the following way:

```
iptables -t nat -A POSTROUTING -o ppp0 -j MASQUERADE
```

This enables masquerading on the `ppp0` interface, but you can activate it on all PPP interfaces (`ppp+`) or an Ethernet interface if your network configuration dictates this. If an ISP has assigned static IP addresses, SNAT should be used instead. The easiest way to do this is with the following command:

```
iptables -t nat -A POSTROUTING -o eth0 SNAT --to 1.2.3.4
```

where 1.2.3.4 is the static IP address assigned by the ISP. It's possible to configure additional static IP addresses here (if they have been assigned) with the use of subnet mask or significant digit notation, or with multiple uses of the `--to` switch.

For home networks, the most common use for DNAT is for Port Forwarding. Referring to the second diagram, imagine that you need to forward requests on port 80 of our gateway to port 80 on Host 1. The following achieves this:

```
iptables -t nat -A PREROUTING -i ppp0 -p tcp --destination-port 80 \
-j DNAT --to 192.168.0.11:80
```

The last type of packet manipulation shown here is port redirection. This technically falls under the classification of NAT, even though a NAT operation isn't performed. Say that a gateway runs an FTP server on port 27, but you want people to connect to it using port 21. The following command redirects requests to port 21 to port 27:

```
iptables -t nat -A PREROUTING -i ppp0 -p tcp --destination-port 21 \
-j REDIRECT --to-port 27
```

When setting up NAT rules, it is important to consider other chains, especially the FORWARD chain. For example, if the default policy for the FORWARD chain is DROP, you must specify what types of traffic you want to forward to your internal hosts, and what types of traffic you want to allow out to the Internet.

NAT has some limitations. Many protocols don't like being NATified, but some have had specific modules written in order to allow them to operate in a NAT environment. One example is FTP.

Loading the `ip_conntrack_ftp.o` and `ip_nat_ftp.o` modules into the kernel should allow you to establish active, along with passive, FTP connections. It's worth noting that other protocols (such as IPsec) won't work under NAT at all. [ETITB](#)

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# Getting GigE with it

**Matt Overington** explains how lightning-fast home networks are now within reach.

We've all twiddled our thumbs waiting for large files to transfer from one network machine to another, or faced the frustrations of high pings and lags in network gameplay. Network equipment isn't groundbreaking, but the ability to fling files across a home or small office network at warp speed is appealing. The Gigabit Ethernet (GigE — also known as 1000BaseT) equipment to enable such rapid data transfer has been on the market for a while, but its price has finally dropped to a point that makes it appealing to users beyond the enterprise.

## LIGHTNING FAST FILES

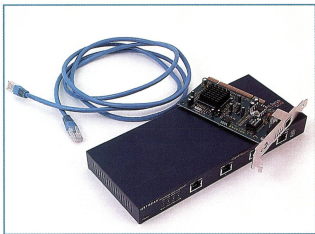
Nowadays, it's common to find households with more than one PC. Many power users back up the data on one machine to a repository on a network drive, but this can take hours. If you back up any data over a network, you'll appreciate the speed boost a Gigabit network provides over older 10- or 100BaseT (10Mbit and 100Mbit) infrastructures. And a high-speed network coupled with a solid backup regime actually helps secure data.

But the benefits don't end at fast file transfers and low pings for network gaming. In a wired house with a centralised server, it's possible to stream a DVD over the network to client machines in a lounge room or bedroom. You can even edit DV over a Gigabit network — a massive benefit if you live in a house where only one machine has a large hard disk. Granted, this is achievable with a 100Mbit network, but it also slows all other network traffic. If a few people are trying to share network resources, the network grinds to a standstill.

Older multiplayer games place a massive load on network infrastructure, despite the fact that they are designed for Internet play. Improved data optimisation techniques mean that modern network games are adequately served by 100BaseT networks, but older games can flood a network. LAN parties are also notoriously bandwidth-hungry, in part because of the file-swapping that takes place in the background. As such, hardcore gamers are looking beyond 100BaseT for lightning-fast gaming performance. After all, every millisecond counts when you've got legions of enemies desperately trying to frag you.

## CABLING

The good news is that you can run a Gigabit Ethernet connection over conventional CAT 5 cabling. Under 10- or 100Mbit connections, only two of the four twisted pairs inside a CAT 5 cable carry data. The other two supply Power over Ethernet (POE) or telephone connections along the same cable. Gigabit Ethernet relies on all four twisted pairs to facilitate four 250Mbit data channels. There's a good chance that all four pairs will be connected when you purchase your Ethernet cables, but if only two are in place, the network defaults



► **Fat pipes:** Gigabit Ethernet hardware prices are low enough to be within the home user's reach.

back to 100Mbit/s. Most offices and cables constructed after 1996, when the standard was ratified, should be GigE-capable.

As it stands, Gigabit network traffic is extremely sensitive to interference and crosstalk. Avoid running your cables near power conduits, and ensure there are no sharp bends in your wiring. Also, check for poor crimp connections or problems with wiring, as differences between channels leads to packet loss and a massive reduction in network speed.

Although a GigE network theoretically increases the maximum throughput speed by a factor of 10 over a 100BaseT network, the boost is nowhere near that level. Interference conspires against the flow of data, keeping the effective network speed fluctuating between 200 and 600Mbit/s.

If you have an existing 100Mbit network in place, there's a good chance that you can just recycle the original cable infrastructure. If not, you'll have to shell out for new cable at an electronics shop. Don't listen if over-zealous sales staff try to flog you more expensive CAT 6 or CAT 7 cable. CAT 6 has a 200MHz bandwidth limit (twice that of CAT 5), and many sales technicians will tell you that it's required to ensure your network operates at full speed. In reality, it's only beneficial if you're running a 10Gbit network. And running one of those in a home or small office is like parking a Cray supercomputer in your shed — awesome for bragging rights and upping your geek quotient, but of little practical value.

Other than the cabling issues, wiring up a Gigabit Ethernet network is almost the same as configuring a network to run at slower speeds. A crossover cable can be used for linking two computers, but you'll require a hub if you're wiring up an entire workgroup. A hub enables you to plug additional machines into your network, or add a wireless access point so PCs on your wired network can share with the outside world.



The seamless transition from 10- to 100BaseT Ethernet for most home applications came around when the price of 100Mbit networking hardware fell to an affordable level. The same will hold true for GigE networks. Expect the market to flood with 1000BaseT networking equipment over the next 12 to 18 months as the technology filters down and prices drop further. There are already motherboards on the market with Gigabit Ethernet as standard, and many of the notebooks featured in last month's Labs Challenge (APC August, page 56) have 10/100/1000 Ethernet ports.

Apple, a company that's been ahead of the eight-ball for a while, offers Gigabit ports as standard spec on all machines from the Power Mac G4 onwards. With the momentum picking up, it's only a matter of time before Gigabit networks become commonplace.

At the moment GigE hardware is approximately twice the price of 100Mbit equipment. Most modern network hardware manufacturers including Intel, 3Com, D-Link, SMC, Netgear and Billion retail consumer-level Gigabit network equipment. A Network Interface Card (NIC) will set you back around \$100, while a five-port hub retails for approximately \$250. Retail bundle packs consisting of a small hub and two Gigabit adapters go for about \$350.

#### FULL UPGRADE?

The substantial load Gigabit Ethernet places on hardware is one of the stumbling blocks that has slowed its uptake. Widening the pipes in your network is pointless if your PCs can't keep up. As a general rule, you'll need 1Hz of processing speed for every bit per second the network transfers. While this means that any Pentium-class machine is acceptable for a 100BaseT network, moving up to Gigabit speeds

places a substantial load on the CPU. We recommend that you only build a GigE network if the clock speeds of each of your wired machines exceeds 750MHz.

Unfortunately, early versions of Windows don't have efficient TCP/IP stacks and can't supply data quickly enough to fill a Gigabit Ethernet pipe, irrespective of the PC's processor speed. Windows 2000, XP and 2003 are the only flavours of Windows robust enough to handle the demands of high-speed Ethernet, due to their roots in the server space. Linux and Mac OS X support GigE as standard.

#### IS IT WORTH IT?

The decision to deploy a Gigabit network in your home or small office depends largely on the amount of infrastructure you'll have to replace. If you're lucky, you may only need to purchase a couple of Gigabit Ethernet NICs and a hub or crossover cable to make the transition. Savvy buyers can keep costs below \$400. The biggest catalyst for a network upgrade is the purchase of a Gigabit-capable PC, notebook or motherboard, which are becoming increasingly common.

But if you only have two-pair CAT 5 cabling and modest network requirements, an existing 100BaseT network is sufficient. The cost of replacing the cabling is the real killer — especially if you want it piped through the walls. It's not uncommon for small businesses to spend upwards of \$1,000 laying data cable, which can form a significant part of an annual IT budget.

The decision to implement a high-speed network is entirely yours, but either way, it's inevitable that we'll all be running Gigabit networks in the future. [ETIP](#)

## HARDWARE HASSLES? ISP HANG-UPS? PC WARRANTY WOES?

APC's 2003 Service & Reliability Survey is the chance to have *your* say! Tell us about your experiences with desktops, notebooks and ISPs. Good and bad, the winners and the sinners — we want to hear it all. The survey closes midnight, Sunday August 31, and there's over \$2,000 in cash and prizes to be won.

APC's 2003 Service & Reliability Survey:  
Have your say at [apcmag.com](http://apcmag.com)





# Dazzle with dHTML

Bring interactivity to your HTML code without leaving the text editor. **Steven Noble** shares the source.

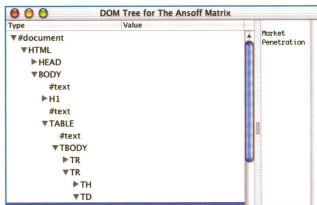
A Web page isn't a sheet of paper, so why should it be as static as one? That's the rationale behind dynamic HTML (dHTML). Every part of a Web page can move, change colour and content, or vanish in response to a visitor's actions.

dHTML is sometimes described as a combination of three Web technologies — HTML, CSS and JavaScript — but it's more than that. At the core is the Document Object Model (DOM), a tree-like "map" giving the precise location to every element in an HTML document. With this map, DOM-aware scripting languages such as JavaScript can find, read, change, create or destroy any element in a Web page, or the element's content, HTML attributes or CSS properties. The entire Web page can be interactive.

And because dHTML is based on open standards rather than a particular company's technology, you can create these Web pages using any text editor, search them with Google, view them without downloading Web browser plug-ins, validate them against World Wide Web Consortium specs, and access their text content using a text-only browser.

## ANSOFF MY BROWSER

Start with `ansoff.html`, a plain text file that's in the `1st_step` directory on this month's cover CD set. Note that the DOS-, Unix- and Mac-line ending versions are identical except for the invisible character marking the end of each line. A Web browser will display



► **Welcome to the jungle:** part of the DOM tree for `ansoff.html`, as revealed by Safari's hidden DOM inspector.

them identically, but some text editors prefer one version to another.

Open `ansoff.html` in any modern Web browser to see that it's a Web page about the Ansoff Matrix — a tool used to classify business growth strategies.

This page is a static document, aside from its basic CSS rollovers (which don't work with Internet Explorer — more about this later). You can print it without losing any information.

But thanks to dHTML, this becomes a dynamic document.

## Q AND A

Open `ansoff.html` in any text editor. If the editor is capable of producing rich or styled text, configure it to produce plain text.

Add `<script type="text/javascript">` and `</script>` tags to the `<head>` area of this file. Between them, create a new JavaScript function called `mp()`:

```
function mp() {
  document.getElementById('strat').firstChild.nodeValue =
  'Grow by releasing existing products into existing markets.';
  document.getElementById('chara').firstChild.nodeValue =
  'Best when markets are growing or competitors are stagnating.';
  document.getElementById('exam').firstChild.nodeValue =
  'Just Jeans adds a new colour to its stretch denim range.';
}
```

Before thinking about the purpose of this function, insert `id="strat"` into the `<td>` tag that immediately follows the Strategy headline in `ansoff.html`. Also, add `id="chara"` and `id="exam"` to the `<td>` tags after Characteristics and Example respectively.

Now, consider the `document.getElementById().firstChild.nodeValue` method, which appears three times in the function called `mp()`. This method uses the DOM to point to the value of the first child of the document element with the specified value for the ID attribute. In other words, `mp()` will find the three sentences tagged with

## On the map

The DOM is a tree-like "map" that gives a precise location to every element in a HTML document. The `document.getElementById()` method uses the DOM, but it's like identifying an element by its phone number rather than its address.

To get to `document.getElementById('strat').firstChild.nodeValue` via its complete address, you could "traverse" the DOM tree using a combination of `firstChild` and `firstSibling` statements, in the form:

```
document.firstChild.firstChild.firstSibling...nodeValue
```

The first child of the document is the `<html>` tag. Its first child is the `<head>`, as that's the first tag to fall within `<html>`. The first sibling of `<head>` is `<body>`, as it's the first tag after `</head>`. The first child of `<body>` is `<h1>` and its first sibling is `<table>`, and so on.

Using a DOM addresses in this form helps with the building of complex dHTML transformations.

Some Web browsers, including Mozilla, provide a DOM inspector, which makes it easier to identify an element's DOM address.

<td id="strat"></td>, <td id="chara"></td> and <td id="exam"></td>. Then it will change them to the three sentences in the function.

In the 2nd\_step folder on the cover CD set is a text file called answers.txt. It contains a few more sentences about the Ansoff Matrix. Use it to build three more functions, called `pd()`, `md()` and `di()`, and slot them into the `<script>` area of `ansoff.html`, after `mp()`.

It's all very well to have these fancy JavaScript functions lying around in the `<head>` area, but `ansoff.html` needs to know when to execute them. So insert `onmouseover="mp()"` into the `<td>` tag that appears immediately before Market Penetration. Now, whenever a Web site visitor hovers their mouse cursor over the Market Penetration table cell, `ansoff.html` will execute `mp()`.

Add similar mouseover events to the Product Development, Market Development and Diversification cells, pointing to `pd()`, `md()` and `di()` respectively.

Open the file in any modern Web browser. The text will update as you move your cursor around the table. If it doesn't, compare your work to `ansoff.html` in the 2nd\_step directory on the cover CD set.

The opposite of the mouseover event is mouse out. To trigger a function that will return the three sentences to their normal state whenever the mouse cursor leaves the Ansoff Matrix, insert `onmouseout="ou()"` into the four `<td>` tags that already have `onmouseover` handlers.

Create an `ou()` function in the `<script>` area. Base the code for this function on `mp()`, and base its text on the three sentences in the body area of `ansoff.html`. A sample file for comparison is in the 3rd\_step directory on the cover CD set.

## BACKWARDS COMPATIBILITY

As it stands, `ansoff.html` uses CSS to create a rollover effect in Ansoff Matrix. Roll the mouse cursor over any of the four main table cells and it will temporarily change colour.

The relevant line of CSS code — `td.quadrant:hover {background-color: #FF6600;}` — is the most logical method of creating this effect, but it doesn't work in Internet Explorer. Why? CSS2 recognises the `:hover` pseudo-selector when it's attached to any element, including `<td>`, but CSS1 recognises it only when it's attached to the `<a>` element. Most modern Web browsers support this part of CSS2, but this is one area where Internet Explorer is still stuck at CSS1.

The workaround is to employ a little more dHTML.

The function `mp()` will activate whenever the mouse cursor hovers over the Market Penetration table cell, so add this line to the start of the function:

```
document.getElementById('mp').style.backgroundColor="#FF6600";
```

This changes the background colour of the document element with the specified ID to `#FF6600`, the colour already used in the CSS version of this rollover. To change any hyphenated

CSS attribute to a segment of a DOM address, drop the hyphen from the attribute's name and capitalise the first letter of its second part — turn `background-color` into `backgroundColor`, for example. So that the new line in `mp()` knows which table cell to recolour, add `id="mp"` to the `<td>` tag immediately before Market Development.

Repeat this step for the Product Development, Market Development and Diversification table cells.

To ensure that all four cells revert to their original colour when the cursor leaves the quadrant, copy all of the `style.backgroundColor` lines in the first four functions and paste them into the `ou()` function. Then change the colours in each statement in `ou()` to `#FFC066` — the "ordinary" colour for the rollover table cells.

Test the result (or `ansoff.html` in the 4th\_step directory on the cover CD set) in Internet Explorer and Netscape Navigator. The browsers will behave identically, despite the differences in their support for CSS. This page is now interactive and fully compatible with every modern Web browser. [HTML](#)

## Dynamic demos

Here are some sites that push dHTML to its limits:

### EASY ANIMATOR

<http://xlat.assembler.org>

It's not a Flash movie — it's just a bunch of GIFs being jostled by dHTML.

### SPACE SAVER

[www.sitepoint.com](http://www.sitepoint.com)

Click through to any article on this site, and then click the Hide Nav tab on the left-hand navigation panel to slide it out of view.

### TOTAL EDUCATOR

<http://curiousique.com/jykh/major>

Windows, images, text and links enter and leave the screen as you journey through this exploration of the Hiroshima and Nagasaki bombings.

### DRAG AND SCROLL

<http://brainjar.com/dhtml/drag>

Create scrolling windows that visitors can drag around a Web page, similar to an operating system's application windows.

### KEYBOARD CONTROL

<http://virtualgeoff.com/dumpster/innerHTML/keypress.html>

With dHTML, this Web page responds to live keyboard input.

### TABLE SORT

<http://brainjar.com/dhtml/tablesort>

Click a column to sort it in the Web browser without retrieving new data from the server.



# Shaping up

**Trevor Morris uses Photoshop's shape layers to combine the power of pixels with the versatility of vectors.**

Introduced in Photoshop 6, shape layers are editable fill layers (gradient, pattern or solid color) bound (or defined) by clipping paths. Photoshop provides tools for many basic geometric shapes as well as several preset custom shapes. You can even edit or combine them to create your own custom shapes.

To illustrate just how versatile these layers are, create a simple road sign using only shape layers and styles. (This will use one other layer, but it won't affect the outcome of this tutorial).

## SIGNING ON

From this point you should set your unit of measurement to pixels. Right-click on the Rulers [Ctrl+R] (View, Rulers) and select Pixels.

Begin by creating a new canvas [Ctrl+N]. Name it "Shape Sign", enter 600 pixels for both the Width and Height, leave the Resolution at 72 pixels/inch, the Mode should be RGB Color, and choose Transparent for the Contents.

To use a gradient fill layer as the background, set the Foreground Color to R192, G192, B192 [#C0C0C0] and the Background Color to R174, G176, B255 [#AEB0FF]. Click on the New Fill/Adjustment Layer button at the bottom of the Layers palette and choose Gradient. Choose Foreground to Background from the Gradient drop-down; set the Style to Linear and the Angle to 90°. Double-click on the layer name in the Layers palette and change the name to background. Also, since we won't be using the layer mask associated with this layer, delete it by Alt-clicking the Trash icon.

Next, Alt-click on the New Set button, at the bottom of the Layers palette, to add a new layer set named SIGN. Name layers in lower case and sets in upper case so you can easily distinguish between the two when selecting layers or sets via the right-context menu (with the Move tool [V]).

Since most of the image will be in the centre of the canvas, it's useful to add some guides. From the View menu, choose New Guide, select Horizontal for Orientation and enter 50% for the Position. Follow the same procedure to add a vertical guide. Also make sure that both View, Snap [Ctrl+Z] and View, Snap To, Guides are enabled.

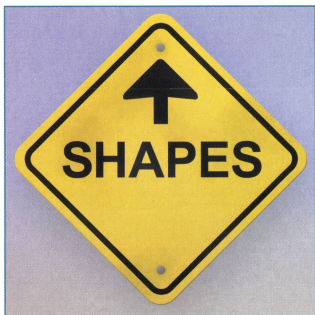
## DIFFERENT STROKES

Now that the canvas is ready, set the Foreground Color to R255,

### For Mac users

Mac users, when following the instructions in this article, please substitute these keys:

Option for Alt  
Command for Control  
Ctrl+click for Right-click



► **Gritty:** adding a surface gradient and some "dirt" completes the image.

G225, B50 [#FFE132] and select the Rounded Rectangle (Shape) tool [U]. In the Options palette (Window, Show Options), ensure that the Shape Layer button is depressed, and enter 38px for the Radius. Also, make sure that the Info palette is visible [F8] (Window, Show Info).

Place your cursor where the guides meet in the centre of the canvas and drag out a rounded rectangle. Once you've started dragging, press both the Alt and Shift keys, and make the rectangle about 420 pixels wide (use the W and H values in the Info palette as a reference). Be sure to release the mouse button before releasing the Alt and Shift keys. Choose Edit, Free Transform Path [Ctrl+T], and rotate the shape by 45°. Then press Ctrl+Enter on the keypad, or Enter on the keyboard. Name this new shape layer "Sign".

You can rotate with the Shift key held down to constrain the rotation to 15° increments, or you may simply enter 45° in the Set Rotation field in the Options palette.

## PLUMBING THE DEPTHS

Styles are an easy way to add depth to the sign layer. First, choose Drop Shadow from the Add Layer Style button. In the Layer Style dialog box, enter the following values for the shadow (and leave the rest of the values set to their defaults): Opacity, 20%; Angle, 110° (with Use Global Angle turned off); Distance, 10px; Size, 40px; and Noise, 5px. Before closing the Styles dialog box, choose Bevel and Emboss (click on the name, not just the checkmark) from the list of styles on the left. Enter the following numbers (again, leaving the rest of the values set to their defaults): Size, 1px; Angle, 120° (Use Global Light enabled); Attitude, 30°; Highlight Opacity, 40%; and Shadow Opacity, 40%. Press OK to apply the style.

## DON'T FENCE ME IN

Now you need to add another shape layer to define the inner border. Create a new layer [Ctrl+Shift+N] (Alt-click on the Create Layer button at the bottom of the Layers palette) and name it "Stroke".

► **Stroke it:** use another shape layer (with Hard Light blending mode) to create an inner border.

Set the Foreground Color to 50% Gray (R128, G128, B128) [#808080], select the Rounded Rectangle tool [U] and change the Radius to 24px. Use the procedure described above to draw a centred rectangle approximately 376 pixels wide. And, once again, use Edit, Free Transform Path [Ctrl+T] to rotate the shape by 45°.

To put in the border, choose Stroke from the Add Layer Style button and enter: Size, 12px; Position, Center; Blend Mode, Normal; and Color, R20,G20,B20 [#141414]. Click OK. Change the layer blending mode to Hard Light [Alt-Shift-H] using the Blending Mode drop down at the top of the Layers palette. Notice that the grey disappears, leaving only the stroke visible. That's because Hard Light multiplies (darkens) dark tones and screens (lightens) light tones, but ignores 50% grey — rendering it invisible.

You can create the arrow by combining two basic shapes. Begin by adding a new layer named arrow, set the Foreground Color to R20, G20, B20 [#141414] and select the Polygon tool [U]. In the Options palette, check to make sure that the Shape Layers button [+] is depressed and then enter 3 for the number of Sides. Position the mouse pointer anywhere over the vertical guide and Shift-drag until you have a triangle that is approximately 65px in diameter. If necessary, use the Path Component Selection tool [A] (or press Ctrl) to position the triangle near the top of the road sign.

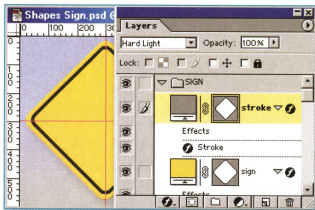
To add the stem to the arrow, press the Add Shape Area button in the Options palette and select the Rectangle tool [U]. Position the mouse pointer over the vertical guide, just below the triangle, and, while holding down the Alt key (to draw from centre), drag out a rectangle that is approximately 26 x 72 pixels (WH). Using the Path Component Selection tool [A], position the rectangle so that it slightly overlaps the bottom of the triangle. Shift-click on the triangle - both shapes should be selected - then press the Combine button in the Options palette to join them together. Press Enter to deselect the path selection outline.

#### SNAP DRAGGIN'

With the Type tool selected, enter the following values in the Options palette: Font, Arial; Style, Bold; Size, 96pt; Anti-Aliasing, Crisp, Center Justify; Color, R20, G20, B20 [#141414]. Click near the centre of the canvas and type SHAPES. To quickly centre the type, select the entire canvas, then select the Move tool, and press the Vertical Align button (on the Options palette) followed by Horizontal Align button. Alternatively, you can use the Move tool to drag/snap the type layer to the centre of the two intersecting guides.

Now it's time to apply some subtle details to make the sign look a little more realistic. Create a new layer named screws, set the Foreground Color to R140, G140, B140 [#8C8C8C], and then select the Ellipse tool. Position the mouse pointer over the vertical guide near the top of the sign, between the border and the arrowhead. Drag and then hold down Alt-Shift to draw a circle that has a diameter of approximately 16 pixels. Remember to release the mouse button before you release the Alt and Shift keys. Select the Move tool and then Alt-Shift-drag a duplicate of the screw to the bottom of the sign.

To give the screws some depth, choose Drop Shadow from the Add Layer Style button and enter the following values: Opacity, 25%; Distance, 1px; Size, 8px; and Noise, 4%. Before closing the Styles dialog box, select Bevel and Emboss and enter: Size, 15px; Highlight



Opacity, 90%; and Shadow Opacity, 30%. Finally, select Stroke and enter these values: Size, 1px; Opacity, 10%; and Color, R0,G0,B0 [#000000]. Press OK.

Alt-click on the Create Layer icon. In the New Layer dialog box, enter effects for the Name, choose Hard Light from the Mode drop-down and enable the Fill with Hard-Light-neutral color (50% gray) option. With the Effects layer selected, drag the layer clipping path (thumbnail) associated with the Sign layer onto the Add Mask button. There should now be a duplicate of the Sign layer's clipping path attached to the current layer.

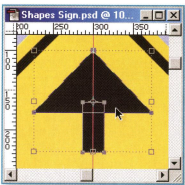
To give the illusion that the sign is lit from above, set the Foreground Color to R20, G20, B20 [#141414]. Choose Inner Shadow from the Add Layer Style button and enter the following: Blend Mode, Screen; Opacity, 10%; Angle, 135° (Use Global Light unchecked); Distance, 150px; and Size, 150px. From the Style list on the left, choose Gradient Overlay and enter these values: Blend Mode, Multiply; Opacity, 10%; Gradient, Foreground to Transparent; and Angle, 110°. Press OK.

#### DIRTY WORK

As a final touch, add some "dirt" to the sign. Alt-click on the Create Layer icon and name it "Dirt". Activate Group With Previous Layer; Mode, Soft Light; and Opacity, 30%. Then choose Filter, Render, Clouds. If you don't like the appearance of the dirt, simply press Ctrl+F (Filter, Clouds) to reapply the filter. You may also hold the Alt key down to increase the contrast of the Clouds filter.

Because this entire image (except for the Dirt layer) was created with shapes and styles, it can be resized without losing any quality.

You should note also that styles aren't affected by changes in image dimensions. To scale the styles and the image simultaneously, you must change the image's resolution (using Image, Image Size, Resolution); or, you can choose Layer, Layer Style, Scale Effects and enter the same value (%) by which you scaled the image. [CLIP IT](#)



► **Mix and match:** combine a triangle and rectangle to create an arrow.





# Come the REBOLution

**Matt Overington and Stephen Withers demonstrate  
how REBOL brings powerful multi-platform  
scripting to the masses.**

There are plenty of basic scripting languages out there for Unix-based operating systems, but Windows users have traditionally been left high and dry by the obscurity and lack of features of most Windows scripting languages. Many DOS old hands lament that the simple elegance and power of batch files was lost after Windows Me, when they were forced to pick up Windows scripting or Visual Basic (VB).

As the name suggests, REBOL (Relative Expression-Based Object Language) is an object-oriented language, aimed at filling the gap and enabling entry-level programmers and even non-coders to construct useful tools.

REBOL is available for most popular platforms, including Windows (95 and later, plus CE), Linux, Mac OS (classic and X), Amiga, Be and Unix (BSD, HP-UX, AIX, SCO, IRIX, Solaris) — over 40 builds in all. Code developed on one platform works on all the others.

There are a few REBOL elements available, but beginners should focus on REBOL/Core, the free, console-based heart of the language. Basic interpreters provide an environment that gives even beginner programmers close contact with their programs. Although scripts are normally prepared in a text editor and then run from the console, REBOL restores this intimacy: you can type in an expression to have it evaluated, examine the values of variables after an error occurs in a program, and experiment until you understand what's happening with your code.

Also available is REBOL/View, which adds graphics support and is free for non-commercial use, and REBOL/Command, which includes external database support, encryption, Windows registry access and a fast CGI interface, but this is commercially-licensed.

One of REBOL's biggest drawbacks is its built-in support for network protocols such as HTTP and POP, combined with a user-friendly syntax. The structure appeals to non-programmers as it resembles plain English and can be read without much knowledge of the language. This makes it extremely easy to interpret and edit other people's code.

Many common programming projects are Internet-related, but time constraints and the complexity of the languages involved also mean that most people aren't free pursue them. REBOL's lead developer, Carl Sassenrath, has designed the scripting language to appeal to exactly this market. It's geared towards being able to produce useful functions in a minimal amount of time.

For example, if you come across a great page that you want to send to a friend via email, you can read a Web page in just one line, then send the HTML as an email message in another:

```
page: read http://www.example.com
send user@example.com page
```

That doesn't require any **include** or **uses** statements, and the notation makes sense and is extremely compact. If you want to be yet more concise, you can even shrink it to one line:

```
send user@example.com read http://www.example.com
```

That slightly reduces the clarity for non-programmers, but it's still quite easy to follow. Note the use of the colon (:) in the first example. This is extremely similar to, but not quite the same as, a conventional assignment operation under other programming languages. Most languages, like C/C++/C#, Java or Pascal use variables to work with data, but REBOL relies on pointers. The **page:** read <http://www.example.com> line is actually setting **page** to point to [www.example.com](http://www.example.com), and not filling the "page" variable with the data contained at [www.example.com](http://www.example.com).

## CONSTRUCTS

Another selling point for REBOL is its consistency of syntax. Every programming language has a way to define blocks, and REBOL is no exception. Square brackets ([ ]) are employed to denote blocks, whether they consist of blocks of code (as in an **if-else** statement) or of data (as in lists or records). Such consistent syntax also shows up in hierarchical situations, such as file paths or object properties (for **folder/file.txt** and **person/height**).

As mentioned, the REBOL acronym implies extensive support for relative expressions. Relative expressions are also known as dialects. Dialects make the language extensible, so if you had a way to interface your computer to the VCR you might use a REBOL statement along the lines of **record channel 9 from 22:30 to 23:45**. Time of day is a standard REBOL data type.

Examples that have already been developed include the Visual Interface Dialect (VID) used by REBOL/View to handle the GUI, a dialect to control Lego robots, and various dialects supporting Flash, HTML, SVG and PDF output. The PDF output dialect is extremely useful and can be used like:

```
layout/pdf [ [textbox ["This is some text..."] ] ]
```

Typically, you would select fonts and sizes, add graphic elements such as lines and boxes, and explicitly position the items on the page, but it's all done using the syntax demonstrated in the above line. For more information on how to drive REBOL/View, head to [www.rebol.com/docs-view.html](http://www.rebol.com/docs-view.html).

## IF AND DO

Just as REBOL was designed to make it easier for people to communicate with computers, it was also intended to simplify communication between computers. Part of that is achieved through the support for various Internet protocols, but REBOL builds on that with a mechanism for exchanging messages via email, HTTP,

FTP and other protocols. These messages can contain code, data or both. In the case of an email message, it is very easy to test whether it came from another REBOL source, and if so, to execute. The following line assumes that `message` already points to an email message:

```
if message/x-rebol do message/content
```

The `do` command executes whatever sits to its right, and the `message/content` refers to the body (content) of the email to which `message` points.

## ONLINE

As with other scripting languages like Perl on Unix-style operating systems, it's possible to make a REBOL script executable by inserting:

```
#!/usr/local/bin/rebol -qs
```

at the very beginning of the script. The `/usr/local/bin/` path could be different on your machine, depending on where REBOL is actually installed. It won't run unless you set the script's permissions to executable. Again, this applies under Unix-based operating systems like Linux or Mac OS X. See <http://tomsprograms.toms-world.org/CHMODGuide.php> for information on how to use CHMOD to change permissions. Like Perl, you can also use REBOL for CGI scripting.

## BEAR IN MIND ...

REBOL has a few quirks that can trip up beginners and experienced programmers alike, but overall makes life much easier for small projects. Even its idiosyncracies can be generally be regarded as positive; they're just something to be aware of.

As with most scripting languages, you don't declare variables as being of a particular type. Instead, you just use them and the type is determined by whatever they point to. REBOL's support for Internet protocols also includes data types such as email for email addresses. A logical expression such as `a = b` evaluates as false if the variables are of different types. When you read an address (to, from, etc) from a received email, its data type is email. If you compare it with a value that you've entered in response to an ask statement (the equivalent of Basic's input), the match will fail because the latter is a string. One way around this is to use `form` to convert from email to string.

The ability to execute messages received from other computers clearly presents a security issue. By default, REBOL seeks your approval before allowing a script to create or modify a file outside of the script's startup directory. That's a useful precaution when you're testing code, but you can't really call it secure as one line of code is sufficient to read an entire file and email it to an arbitrary address.

When developing scripts that process messages from elsewhere, consider limiting them to trusted senders, parse all messages to ensure their contents are as expected, and use secure to set appropriate access rights for file and network access.

## PRACTICAL APPLICATIONS

REBOL is all about solving problems quickly, and with minimal effort. One such problem for many Internet users is spam. Old addresses can prove problematic, even with dedicated filters installed.

Many Aussie ISPs are registered in both .com and .com.au domain spaces, but the .com aliases tend to suffer the most spam attacks. This led us to think of a practical REBOL project, that checks the mailbox and deletes any messages to the .com address, but leaves those to .com.au intact. Called before the mail client is opened, this script ensures most spam is never downloaded to the email application.

Several variations on the REBOL spam-killer idea can be found on the Web, but none exactly meets this need. It opens the mailbox, and examines each message. For each, it scans the header for the To: address list, and deletes that message if and only if the .com address is present and the .com.au variant is not. Most genuine messages won't be sent to both versions of the address, but it's best to play it safe.

You'll find a copy of the script called "filtermail.r" on this month's cover CD set. As you can see, the script is extremely simple and doesn't include error-trapping, but it's only for personal use only.

It could've been simpler if we decided to arbitrarily delete any message sent to the .com address, as REBOL provides a command (find) that could be used to scan the list of addresses for that in one go.

As yet, REBOL hasn't attracted a large ecosystem of developers, add-on products, books and so on. To that end, it's not recommended that you use it for a mission-critical, high-value application, regardless of its technical suitability, but it has a lot going for it when used in smaller-scale projects. Its success depends on uptake, so what are you waiting for? [\[11\]](#)

## Rebol resources

### REBOL TECHNOLOGIES

[www.rebol.com](http://www.rebol.com)

### REBOL LIBRARY PROJECT

[www.rebol.org](http://www.rebol.org)

### REBOL FORCES

[www.rebolforces.com](http://www.rebolforces.com)

### CODECONSCIOUS.COM

[www.codeconscious.com/rebol](http://www.codeconscious.com/rebol)

### REBOL SCRIPTING BASICS

[www.ibm.com/developerworks/edu/1-dw-linuxrebol-1.html](http://www.ibm.com/developerworks/edu/1-dw-linuxrebol-1.html)

### REBOL HOW-TO'S

[html.ozbytes.net.au/programmer/rebolmaintut.html](http://html.ozbytes.net.au/programmer/rebolmaintut.html)

### USING REBOL SCRIPTING WITH MICROSOFT'S PERSONAL WEB SERVER

[www.jansfreeware.com/articles/pwsrebol.html](http://www.jansfreeware.com/articles/pwsrebol.html)

### REBOL/FLASH DIALECT

[oldes.multimedia.cz/swf/](http://oldes.multimedia.cz/swf/)

### SIMPLE CONTENT MANAGEMENT

[www.alistapart.com/stories/simplecontentmanagement/](http://www.alistapart.com/stories/simplecontentmanagement/)



# App-solutely fabulous

Those built-in apps are strictly for beginners.

**Jenneth Orantia** shows how to beef them up or replace them with turbo-charged versions.

You can do so much with a handheld straight out of the box, but the standard Palm and Pocket PC applets tend to be pretty lightweight. They're enough to get you started, but you'll soon want more features, more convenient touches, more ways to make your PDA work the way you do.

## BLASTING OFF

Palm fans should begin by replacing the launcher. It's barely functional, rather bland and there's no shortage of alternatives. Launcher X ([www.launcherx.com](http://www.launcherx.com)) and ZLauncher ([www.zztechs.com](http://www.zztechs.com)) both have extensive customisation options and provide fast and easy access to programs, settings and functions. Plus, their wide libraries of downloadable skins let you stamp some personality into your Palm. Or try Wassup ([www.pocketscience.com](http://www.pocketscience.com)), which gives users an agenda screen and buttons that can run commonly used applets.

The Pocket PC's Today screen provides a summary of the day's appointments, tasks and unread emails. Because the screen uses plug-ins to display information such as date, calendar and inbox items, many Pocket PC power users enhance it with plug-ins rather than replacing it.

The Today screen's bundled appointment and task plug-ins provide an itemised overview of your schedule, but as they only give you a count of items for that day, you still need to open separate programs to get to the details.

QuickAgenda and QuickTasks ([www.scarybearsoftware.com](http://www.scarybearsoftware.com) for both) are shareware plug-ins that display the particulars of appointments and tasks on the Today screen, which means less time switching between applications. Replacing the default plug-ins is as simple as installing the replacement programs and going into Start, Settings, Today, Items to uncheck the originals.

Choice plug-ins that add new info to the screen include StartPad ([www.stellarmetrics.com](http://www.stellarmetrics.com)). It adds application launch buttons, along with icons for accessing system tools. Journal Bar ([www.omegaone.com](http://www.omegaone.com)) displays the weekly weather forecast, stock quotes, movies times and news, all downloaded from the Net each time you perform an ActiveSync. Battery Pack ([www.omegaone.com](http://www.omegaone.com)) serves detailed info on the battery and memory status as well as providing a program launcher.

## DATE DABBLING

Although handhelds have become more than just organisers, one of their core functions is still keeping track of appointments and events. The Palm and Pocket PC schedulers are easy to use, but their simplicity means limitations aplenty.

Palm's Date Book seriously lacks display options. For instance, the weekly view doesn't show any appointment information, requiring you to either tap on the time box for the details or open the day view. While having a weekly view is good for planning ahead, the less tapping and more information "at a glance" the better.

DateMan ([www.standalone.com](http://www.standalone.com)) improves on the functionality of Date Book without overloading the user with options. One of its best features is the agenda view, displaying appointments and tasks for a set number of days in a list format. The week view also improves on Date Book's method. Additional features include support for multi-day events and journal entries.

If you want Date Book to have more features, Date85 is definitely worth a look ([www.pimlicoftware.com](http://www.pimlicoftware.com)). It incorporates all of the above functionality, and more, into the same basic interface as the built-in scheduler.

The Pocket PC Calendar, on the other hand, isn't very intuitive. While multiple views are supported, information isn't presented in an easily comprehensible manner.

PenAgenda ([www.penandinc.net](http://www.penandinc.net)) doesn't replace the built-in Calendar, but presents a unique way to view your schedule. It displays all upcoming meetings and related notes over a three-month period using enhanced day names, meaning that



▶ **Week link:** DateMan's agenda view lists appointments and tasks.



▶ **Launchpad:** forget the barely functional Palm launcher and check out LauncherX.



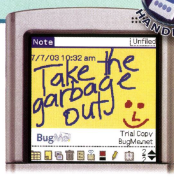
▶ **Calling all contacts:** quickly find what you're looking for with SuperNames.



▶ **See everything:** PenAgenda blasts away the clutter of the Pocket PC's Calendar applet to show appointments in a more intuitive fashion.



▶ **Business address book:** Essential Contax Professional makes ample use of colour for easier viewing.



▶ **Noteworthy moment:** Palm's Notepad is good for a quick scribble, but BugMe has full-colour support and advanced reminder functionality.

engagements are categorised as "tomorrow", "this Tuesday" or "next Friday", enabling you to more naturally view and schedule appointments.

## HARD TASKMASTER

The busier you are, the more inadequate Palm's ToDo program becomes. You can't set task reminders, tasks can't be set to repeat on selected days, and there's no indication in the main view of each task's due date — so you can easily miss a deadline.

ToDo Plus ([www.handshigh.com](http://www.handshigh.com)) supports reminders, repeats tasks and displays due dates, with additional tricks such as filtering by date and adding drawing attachments.

The Pocket PC Task program supports many useful features, such as reminders and recurring tasks, and displaying overdue items in red. However, the three levels of priority (low, normal, high) may not be enough for people with demanding workloads.

SmartTasks ([www.bluemako.com](http://www.bluemako.com)) enhances the Task program's overall functionality by letting you set the importance of a task using the letters A to F and numbers 1 to 7. Tasks are then classified as "A" for things that must be completed, "B" for things that should be completed and "C" for things that, if possible, can be completed, with the remaining letters for everything else. Tasks within each letter are then designated a number in order of importance.

## NO FIXED ADDRESS

Palm's Address Book is an acceptable contact manager. Typing the first few letters of a contact in the Look Up field makes it jump to the relevant entry. Contacts can be filtered by changing the category displayed, and it supports up to four custom fields per person. The Address Book appears to cover the field rather well, although the display options are limited and navigating between different contacts is cumbersome.

SuperNames ([www.standalone.com](http://www.standalone.com)) is a polished Address Book that displays alphabetical and category tabs for quick switching between contacts, as well as easy access to settings like font size and contact display format. Multiple grouping options are available to group contacts based on criteria such as surname, company and country.

Contacts 4 ([www.pdperformance.com](http://www.pdperformance.com)) is a heavy-duty contacts manager with a highly configurable interface.

Windows-powered handhelds running on a pre-Pocket PC 2002 OS can't view contacts by company in the built-in Contacts application. This view can be useful when using your Address Book for business purposes, particularly when you know the name of the company you wish to call rather than a specific employee.

Essential Contax Professional ([www.pocketx.net](http://www.pocketx.net)) offers this

functionality, as well as a number of extra features. It displays information using a form-based template which, when coupled with colour-coded fields, makes it much easier to digest contact details at a glance. Other useful attributes include a recent contacts list for quickly jumping to previously viewed contacts, plus business and home tabs for separating information according to usage.

## NOTE TO SELF

Palm's Notepad is handy for jotting down thoughts, and it does its job quite well. You can scribble down a note in your own handwriting, give it a heading and category and even set an alarm for the note so you can be reminded about it on a particular time and day.

The colourful BugMe ([www.electricpocket.com](http://www.electricpocket.com)) takes up where Notepad leaves off. You can set reminders based on minutes, hours and days rather than a specific day and time (although this is also supported). The drawing tools are more sophisticated, allowing the use of different colours and shapes.

If you find yourself scratching your head over notes you can barely read, a safer bet is Palm's Memo Pad, which uses text entry instead of capturing an inked drawing. Memo PLUS ([www.handshigh.com](http://www.handshigh.com)) uses the same records as Memo Pad but adds a raft of extra features including templates, alarms, per-memo password protection and even freehand drawing attachments.

The Notes program on the Pocket PC can embed voice recordings, convert scribbles into plain text and view the note at different zoom levels. However, unlike the Palm Notepad, there's no facility to attach reminders to notes. Different colours and pen input options are also absent. Its biggest limitation is the inability to categorise notes. HandNotes ([www.choung.net](http://www.choung.net)) supports categorising notes into different folders, as well as the ability to change pen colour and background, though it can't embed voice recordings or convert notes to text. [bit.ly](http://bit.ly)

## Super PIMS

Why mix and match a set of different applications when you can have it all in one? Programs such as Agendus Professional ([www.iambic.com](http://www.iambic.com)) for Palm, and Pocket Informant ([www.pocketinformant.com](http://www.pocketinformant.com)) for Pocket PC, are typically more sophisticated than their single-function counterparts as they integrate appointments, tasks, contacts and sometimes email and notes into the one program. Additional advanced features include category icons, hierarchical tasks, journal entries and multiple views. If you're looking to replace all of the built-in PIM applications on your handheld, this is a good, cheap alternative to buying separate programs. The combined applications enable linking and relation between different items, providing a more cohesive means of managing your personal information.





PC

## Colin McRae Rally 3.0

**Many regard the 2.0 version of Colin McRae Rally as the best PC rally game of all time. So what's gone wrong with the sequel? By Justin Kranzl.**

In the world of entertainment, software probably lends itself to sequels better than any other medium because technological progress ensures that developers have more power available as time passes. For this reason, Colin McRae Rally 3.0 on PC is a major disappointment.

The developer, Codemasters, has made few positive moves, and a lot of regrettable ones.

The problem is one of developmental priorities. Codemasters has spent a lot of time on car modelling and not enough on making the playing experience worthwhile.

On the surface, CMR 3.0 slides by on looks. The cars look great—they're detailed, with lots of parts that tend to fall off in collision with the scenery. The tracks are mapped out with levels of precision that will bring a tear to many a rally lover's eye.

But digging beneath the surface reveals major issues, and the serious questions arise as soon as installation begins: 3.5GB of hard drive space is required.

Start the game and the errors and omissions begin to accumulate: repeated crashes to desktop for many configurations of Windows XP; the choice of one car for the game's career (championship) mode; incorrect and missing stage notes about some of the locations; superficial force feedback effects for wheel peripherals; and audio that breaks up into static on lesser machines.

Colin McRae still drives for Ford in the game rather than for his new team, Citroën. This would be forgivable for a minor personality, but this one's name is the main selling point for the software. Getting his team status correct should have been a priority.

Meanwhile, for the growing ranks of multiplayer fans, LAN and internet play—big selling points for its predecessor—aren't offered. Multiplayer in CMR 3.0 has been downsized to an inadequate split-screen mode. It's tolerable if you're on a large television set with multiple controllers, but not when playing on a PC.

These issues constantly remind players how poorly the game has made the trip from console. They would frustrate in any rally title, let alone one with such a well-received predecessor.

Equally questionable are the steep system requirements to play smoothly in decent detail. The middling power of PlayStation2 and Xbox seem to handle the game much better than the average gamer's PC.

With regard to vehicle handling, CMR 3.0 is inconsistent. If one word describes the handling, it's "twitchy". All vehicles in the CMR 3.0 world seem to have prodigious oversteering when on tarmac.



► In reverse: the McRae series goes downhill in 3.0.

Off-road handling improves but still feels superficial compared to the upper echelon of PC rally racers.

Codemasters seems to have dropped the ball in a major way. The abundance of flaws constantly denies players the pleasure of being fully immersed in the title.

It's not just a PC spec issue. All the processing power in the world can't change some of the major flaws. That's up to the developers.

If there's no patch-fixing the array of issues, those willing to keep the faith had best wait for CMR 4.0, assuming it gets released on PC.

CMR 3.0 is that software rarity, a sequel that's worse than the prequel.

Online [www.codemasters.com/colinmcrally3](http://www.codemasters.com/colinmcrally3)

Price \$89.95

Verdict ●●○○○

# F1 Challenge '99 - '02

The only clunky thing about the latest Formula One sim from Electronic Arts is its title. The game itself is nothing short of a masterwork.

F1 Challenge '99-'02 is a step away from Electronic Arts' policy of incremental upgrades. Developed for EA by the talented Image Space Inc ([www.imagespaceinc.com](http://www.imagespaceinc.com)), it's the definitive treatment to date of one of the world's most expensive sports. And while its foundation lies in its predecessor, F1 2002, the game now has a four-year span — with loads of refinements.

Team staff, logos and cars cover the 1999-2002 seasons. Every possible cosmetic and performance aspect from the seasons has been incorporated. Players have 43 vehicles and 34 drivers from 14 teams, and 17 tracks to choose from. For detail-obsessed F1 fans, it's only the beginning of a complete experience.

Few racing simulators attempt to model a truly comprehensive set of vehicular performance characteristics. It's usually dismissed as too fiddly and expert-oriented to be worthwhile. And when the effort has been made, either the lap times between game and reality are wildly disparate or other aspects of the game have been neglected.

But F1 Challenge has an outstanding driving and handling model, with a beautiful graphics engine thrown in. Painstakingly mapped-out tracks reveal quirks that lesser sims simply don't have the time or sophistication to cover. Bumps, ripples and minor shifts in track elevation affect car handling appropriately. Turn off the car invulnerability and you find innumerable ways to destroy your vehicle.

Everything from minor nose damage to total annihilation can be achieved.

A range of difficulty levels and the ability to toggle everything from automatic shifting to traction control means there's a challenge for everyone. At higher levels of difficulty, it's an achievement merely to complete a race, let alone drive competitively. And it's because of this difficulty level, unseen since the likes of Grand Prix Legends, that the game is such a rewarding experience.

A benefit of the exacting modelling is the full-featured, realistic approach to telemetry. You can make a multitude of minor adjustments and track the changes to performance (or let the CPU control this aspect). Enthusiasts can tap into what amounts to a game in itself — a relentless quest balancing out a vast array of variables in the pursuit of speed.

Logging and statistical options allows the recording of all manner of detail. If you're willing to devote the time to it, there are few more satisfying sim racing experiences than tuning a car to peak performance and endurance, racing it to a successful conclusion and, of course, saving the replay.

The way the game looks is also a credit to the developers. While the publisher claims a much lower spec as bare minimum, it's not an enjoyable experience chugging along a track at five frames per second.

A 1GHz PC with a GeForce-class 3D accelerator should be considered the minimum entry requirement. For a truly transcendent racing experience, the game needs 2GHz, plenty of RAM and a leading video card: think Radeon 9700 or GeForce FX. This power gives players a higher resolution, much better detail and smooth frame rates via an extensive list of visual variables.

However, some holdovers from the F1 2002 school of aesthetic questionability remain. The heads-up display screen is ugly, oversized and holds limited information.

At lower detail levels, the cars can look quite chunky. And the inclusion of pixelated grid girls at the start of the race



► **High fidelity:** every possible nuance has been included.

doesn't add to the atmosphere. As with the game's driving aids, most of the extra visual aids can be switched off.

Even humble audio is worth an honourable mention. Despite the limited vocabulary of your pit crew ("You were hit by Schumacher!"), engine noise reaches impressive levels of bass and volume. If you have the PC power and audio hardware, the sounds of all the 20-plus cars in the field can be individually mapped around you.

For budding Schumachers and Montoyas, multiplayer options allow racers to take the challenge online or on LAN. EA's online model is far from ideal, but every year it improves a little. The positioning and split-second timing involved in racing games makes online multiplayer a dicey proposition.

F1 Challenge performs well enough to pass muster. It's not up to the sophistication or freedom of the likes of Live For Speed, but it works well enough over a broadband connection.

Put simply, no other F1 simulation has the flexibility and realism that this game offers. On every level F1 Challenge 99-02 excels: presentation, authenticity and longevity are all top-drawer. Few other games can hope to match the range of tuning options on offer and none for home users can claim a more authentic approach to putting rubber to the road.

F1 Challenge '99-'02 joins Grand Prix Legends, NASCAR Racing Season 2003 and the new Live For Speed at the pinnacle of PC motorsport realism.

**Online** [www.easportsf1.com](http://www.easportsf1.com)

**Price** \$69.95

**Verdict** ●●●●●



► **Just like TV:** the replay mode could pass for real footage.

# Techlife games

## Star Trek: Elite Force II

Activision is suing Viacom for not supporting the Star Trek franchise enough, but Activision's developer, Ritual Entertainment, has met its end of the bargain with Elite Force II.

Boldly going where other first-person shooters (FPS) have gone before isn't a recipe for gaming success, but having big-name backup helps. And in the games market, few licences carry more weight than Star Trek's.

With EF II, Ritual Entertainment has continued with the polished visuals and slick presentation. Using the aging Quake III graphics engine, the only real criticism is beyond Ritual's sphere: Quake III-engine character models tend to have a certain uniformity in their animation, and this carries over to the game.

For Star Trek fans, this is likely to be secondary to the quality of the story.

PC

There are in-jokes to please the most demanding Trekkie, and proper voice acting is a plus.

Gameplay is more likely to divide opinion. The chief concern is the level of adrenaline-charged slaughter often required to progress. The killing gets boring as the touchy-feely Star Trek ethic is overwhelmed by "kill 'em all" engagements.

As for the story, EF II prefers to tell one story well rather than many poorly. Freedom sacrificed by telling a straightforward story is not overly missed, especially in multiplayer mode. There's no shortage of viable network gaming options, both team-oriented and one-man-army style.

EF II is strong in coding finesse. An attractive visual engine with accomplished audio showcases mature design and character modelling.



► **Boldly go forth:** and wreak havoc with a dustbuster.

General-shooter multiplayer might want to ensure a reasonable playing community is available before investing. For Star Trek fans, this is as polished a PC offering as any to date.

Online [www.st-ef2.com](http://www.st-ef2.com)

Price \$89.95

Verdict ●●●●○

## WW2: Frontline Command

The Bitmap Brothers were Amiga gaming stars more than a decade ago. Nowadays, the makers of classics including Speedball II are a much more austere outfit.

Their latest effort, WW2: Frontline Command, is an epic real-time system, and it takes itself very seriously.

The attractive 3D visuals will hook both old and new players into experimenting with the game's two modes. Single-player mode has 25 missions against the Nazi hordes, and multiplayer supports up to four players.

WW2: FC distinguishes itself from the

PC

commonplace RTS ruck by using morale as a characteristic. FPS players commonly complain about the stupidity of their troops — even when they're being slaughtered, they continue to merrily leap into the fray.

Not so in WWI: FC. Certain doom isn't part of the script for these guys, and it helps that the players "care" about their fate rather than viewing humans as just another resource.

Pleasantly diverting, the real-life subject matter may tweak those bored with mythical themes or multiple epoch-spanning titles. Well worth a look.



► **Chins up lads:** keep morale high or face desertion.

Online [www.gamenation.com.au](http://www.gamenation.com.au)

Price \$69.95

Verdict ●●●●○

## Soldier of Fortune II: Double Helix

The Soldier of Fortune franchise hits Xbox in this uninspired port from the PC first-person shooter. You play a mercenary hired to save the world from a chemical threat. This involves gruesomely killing any and all who stand in your way.

For some reason, some of the best parts of the PC original have gone missing. The texture palette is underwhelming, enemy AI is dismal, and weapon aiming and collision detection is idiosyncratic at best.

However, the developer manages to keep the gore factor intact. All manner of dismemberment is possible, depicted in

XBOX

stomach-churning detail. When the body parts start flying, it's one time you'll be thankful for the staccato frame rate.

Stubborn pockets of online players persist with SOF II on PC, and multiplayer is the sole hope for SOF II on Xbox. It makes you feel better when you can commiserate with others who made the same dubious investment.

But the bottom line is that there are better single and multiplayer shooters on Xbox. Both Halo and Return to Castle Wolfenstein offer more engrossing experiences — without the gratuitous gore.



► **Lots of gore:** but SOF II doesn't offer much more.

Online <http://games.activision.com/games/soldieroffortune/xbox.asp>

Price \$99.95

Verdict ●●●○○

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HONG KONG  
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JAKARTA  
SHANGHAI  
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The book disappoints in two areas: readers may already be familiar with the more common protocols (Ethernet Frames, HTTP); and coverage of application-layer

publications — as Windows has moved into larger systems, Redmond documentation has clearly risen to meet the new demands.

**Mike MacCana**

**Publisher** Microsoft Press

**Price** \$135

**ISBN** 0735612919

## Mac OS X in a Nutshell

Going behind the "lickable" interface of OS X has stumped many a long-time Mac user. Under the gloss is the unfamiliar Darwin/BSD command line with a lot of hidden power.

Apart from an overview of how the graphical user interface works, with a comparison of OS 9 and OS X, much of this book is about getting the most out of the OS. Less intuitive admin tools such as NetInfo Manager are covered, and useful automation features include Applescript.

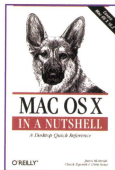
About half the book goes under the OS bonnet. There's a wonderful 230 pages on the powerful OS X command line, terminal and many "hidden" bundled Unix apps. There's even an explanation of how the thoroughly unintuitive Unix vi text editor works.

Also included are some topics not strictly within the book's scope, such as where to find info on POP or IMAP daemons that can be installed in OS X. This adds value to explanations of OS X's inbuilt daemons such as SendMail, which provides SMTP services, but is useful only for outgoing mail unless you get a POP or IMAP daemon as well.

Published in January, *In a Nutshell* is up to date, focusing on X 10.2. It's not a quick-starter like the *For Dummies/Idiots* guides. For thoroughly understanding the software, it's easy to read but doesn't skimp on explanation. There's even amusing banter ("The specifics of configuring ipfw and natd to work together are hairy and arcane").

Incidentally, at 809 pages, we're talking coconut shell, not peanut.

**Dan Warne**



**Publisher** O'Reilly

**Price** \$79.95

**ISBN** 0596003706

## Macromedia and Adobe Web Packs

Web design tools once accessible only to professionals and serious enthusiasts are now widely available through software such as Microsoft FrontPage and, surprisingly, Microsoft Word. Now even beginners can feel confident about creating fully functional Web sites in a few days.

Truly professional Web pages require more than a single piece of software to ensure the graphics, structure and animation are finetuned. Adobe and Macromedia produce software for the task, and Course Publishing promotes these two 520-page books as beginners' guides to their flagship applications.

The Adobe Web Pack covers Adobe Photoshop, Livemotion and GoLive; the Macromedia pack investigates Macromedia Dreamweaver MX, Flash MX and Fireworks MX.

Authors Sherry Bishop, Jim Shuman and Barabara Waxer assume readers have no prior knowledge of the apps. Early chapters on the basics are followed by more complex tools and techniques, including impressive effects such as 3D and animation.

Presentation is superb, with plenty of colour photos and diagrams, and walkthroughs are easily followed, with ever-present examples of what can be created. Must-read information for designers at all levels.

**Alan Crawford**



**Publisher** Course Publishing

**Price** \$99.95

**ISBN** 1592000533 (Macromedia)  
1592000525 (Adobe)

## Linux Server Hacks

Here's 240 pages of hacking in the true sense of the word: solving problems by using existing tools creatively. Hence the subtitle, *100 Industrial-Strength Tips & Tools*.

The book isn't about security or crackers — the network vandals often called hackers. It's for Linux system admins wanting to save time by automating tasks and improving system performance and network reliability.

Author Rob Flickenger entertains with his practical style and humour, producing a no-nonsense guide with some of the more interesting concepts for network engineers, such as transparent proxying, traffic monitoring systems, password-less SSH and round-robin/split-level DNS.

Most of the tools come with Linux distributions (a little scripting is also needed), and example scripts are available at the book's Web site so you don't have to type them out.

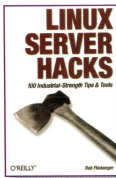
While we like this book, it's not perfect. Flickenger is very knowledgeable, but not as up-to-date with system administration practices as he could be. *Linux Server Hacks* doesn't cover the Linux Standards Base, so you'll have to translate old distribution-specific directories to the standard locations available in most current distros.

Mail seems to mean Sendmail, and ancient RCS is covered, as well as the current CVS. We think the modern Subversion would be a better focus.

Packaging isn't mentioned at all, and the author chucks random files around a hard disk.

Despite these shortcomings, *Linux Server Hacks* is informative, affordable and entertaining. All Linux systems administrators should take a look.

**Mike MacCana**



**Publisher** O'Reilly  
**Price** \$59.95  
**ISBN** 0596004613

## Web Services Security

Those familiar with official Web service specs may not find anything new here, and this book is light on practical implementation solutions and case studies.

However, it's ideal if you need an introduction to security specs and popular implementations, with material coming from the World Wide Web Consortium (W3C), OASIS, WS-Security (IBM and Microsoft), Sun Liberty and Microsoft Passport.

Like all good security references, this one does more than simply teach ways to attack and defend against various technologies. Prior to explaining weapons and tactics to exploit vulnerabilities, introductory material covers the purpose, history and future of Web services.

The authors take nothing for granted, explaining why transport-level encryption via SSL is insufficient. Emphasis is given to key concepts like "persistence" and

separating policy enforcement from decision-making.

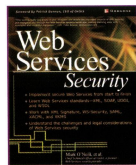
At 312 pages, *Web Services Security* isn't long enough to make you an expert on the subject, but it does provide a comprehensive foundation for consultants and other professionals, doing a good job in a fast-changing field.

Explanations are clear and the authors avoid getting hung up on any particular vendor or technology.

Overall, this title is probably the best Web services security guide on the market. As well as the admirable introduction to the subject, it has material which is neglected elsewhere, such as the Liberty Alliance Project.

Those with questions on Web services security would do well to start looking for answers here.

**David Williams**



**Publisher** Osborne/McGraw-Hill  
**Price** \$89.95  
**ISBN** 0072224711

## Hack Attacks Testing

This book is aimed at systems and network administrators wanting to perform their own security audits. It won't turn you into a skilled penetration tester, but it does introduce some of the best security tools around.

First up are guidelines for performing a successful security audit. The author lists seven important phases:

- 1 Blind testing: remote audits, site scanning, penetration-testing, and IP- and email-spoofing testing.
- 2 Knowledgeable penetration: when information on the target is known to the auditor.
- 3 Internet security and services: DNS-spoofing schemes, auditing scripting code, IP- and ICMP-flooding tests.
- 4 Dial-IP audit: wardialing and trying to find rogue and misconfigured modems.
- 5 Local infrastructure audit: reporting protocol traffic, network segments and bandwidth utilisation.

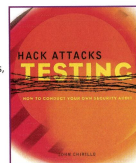
- 6 Wide Area Network audit: equipment discovery and log files.
- 7 Reporting: compilation from all the previous phases.

Much of the book centres on the author's idea of a "tiger box", a multi-boot PC with Windows and Linux OSes, loaded with security-related software tools (Mac OS X is also covered).

The author walks through installing and configuring OSes from starting the computer with a bootable CD. This seems too basic, given that the book is presumably targeted at knowledgeable IT people.

Moving on to the best-known security tools, there are clear instructions for performing an audit with each package. The book closes with a chart ranking each package based on the issues detected.

**David Williams**



**Publisher** John Wiley & Sons  
**Price** \$99.95  
**ISBN** 0471229466

In the October Issue of

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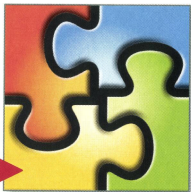
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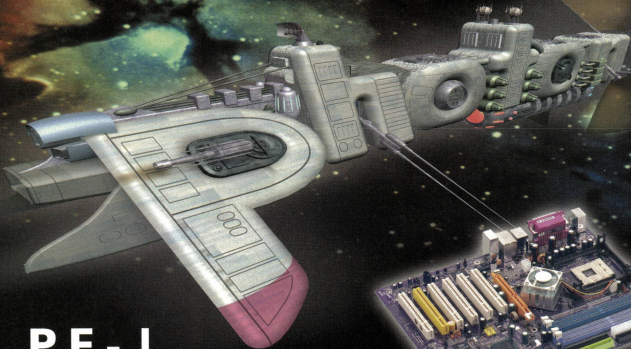
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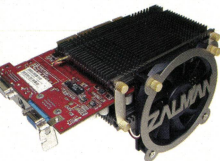
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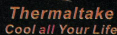
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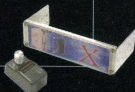


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CC-3BK	BJI-643BK	BJC-600/620 Black	\$7.00
CC-4BK	BKI-21	BJC-2000/4000/5000 Series Black	\$12.00
CC-5CL	BKI-21C	BJC-2000/4000/5000 Series 3-Colour	\$12.00
CC-6BKHC	BJI-2018BK HC	BJC-600/610/620 Hi-Cap Black (14ML)	\$9.00
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CC-8BK	BKI-11	BJC-70 Black	\$9.00
CC-9CL	BKI-11C	BJC-70 3-Colour	\$17.00
CC-11PCL	BKI-61	BJC-7000 Series 3-Colour	\$32.00
CC-12PCL	BKI-62 PHOTO	BJC-7000 Series Photo 6-Colour	\$38.00
CC-13B	BKI-3	BJC-6000 Black	\$26.00
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CE-55CL	SO20049	STYLUS 200/820/Colour II/Its 3-Colour	\$21.00
CE-56PBK	SO20093	STYLUS Colour 400/500/600/Photo Black	\$17.00
CE-57CL	SO20097	STYLUS Colour 200/500 3-Colour	\$23.00
CE-58BK	SO20108	STYLUS Colour 800/850/1520 Black	\$17.00
CE-59CL	SO20089	STYLUS Colour 400/600/800/1520 3-Colour	\$23.00
CE-60PCL	SO20110	STYLUS Colour 700/Photo/Photo 700 5-Colour	\$26.00
CE-61BKCL	SO20138	STYLUS Colour 300 4-Colour	\$16.00
CE-65BK	SO20187	STYLUS Colour 440/640/660 Black	\$16.00
CE-66BK	SO20189	STYLUS Colour 440/640/660 3-Colour	\$16.00
CE-67CL	SO20191	STYLUS Photo 750 5-Colour	\$33.00
CE-68PCL	SO20193	STYLUS Photo 900 Black	\$19.00
CE-69CL	TO03011	STYLUS Colour 900 Colour	\$24.00
CE-70CL	TO05011	STYLUS Photo 1200 5-Colour	\$29.00
CE-71PCL	TO01011	STYLUS Colour 870/1270 Black	\$24.00
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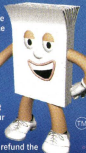
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A4WF	A4 White Film 100mu	50	\$ 47.00	0.94
A3WF	A3 White Film 100mu	50	\$ 90.00	1.80
A4CF	A4 Clear Film 100mu	50	\$ 39.00	0.78
A3CF	A3 Clear Film 100mu	50	\$ 70.00	1.42
A4FGP	A4 Full Gloss Photo Paper	50	\$ 44.00	0.88
A3FGP	A3 Full Gloss Photo Paper	50	\$ 79.00	1.58
A4PH	A4 Economy Photo Paper	50	\$ 23.00	0.46
A2C	Artists Canvas	25	\$ 60.00	2.40
G4F	Greeting Card (4 Folds)	100	\$ 28.00	0.28
GCBF	Greeting Card (B-Fold)	100	\$ 48.00	0.48
DCCS	Double Coated Card Stock	50	\$ 24.00	0.48
GCS	Glossy Card Stock	50	\$ 24.00	0.48
TTP	T-Shirt Transfer Paper	15	\$ 15.00	1.00
MP	Magnetic Paper	25	\$ 58.00	2.32
BC1	Business Cards (10 per A4)	20	\$ 19.00	0.95



**INCLUDES:**  
90gsm coated paper, 90gsm hi-res paper, white film, clear film, full gloss photo paper, economy photo paper, greeting card (4 folds), greeting card (b-fold), glossy card stock, t-shirt transfer paper, business cards and magnetic paper!

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Black kits include superior, dense & sharp black inks

DESCRIPTION (Kits Compatible with Printers listed below)	No. of Refills	Product Code
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CANON BJC-70/BJC 80	60	21-BKL
CANON BC-0102 BJ-110E/20 BJ-200 Series & BJC-1000 Series	9	3-BKL
CANON BJ-300/330	7	4-BKL
CANON BJC-600/610/620	16	5-BKL
CANON BJC-2000/4000/4100/4200/4300/4550/5000/5500 BCI-21	45	19-BKL
CANON BJC-2000/4000/4100/4200/4300/4550/5000/5500 BC-20	9	18-BKL
CANON BJC-3000/6000/8000 Series	12	46-BKL
HP Desk Jet 400/500 Series	6	8A-BKL
HP Desk Jet 600/660/690 Series	6	8B-BKL
HP Desk Jet 700/800/900/1000 Series	8	29-BKL
HP Desk Jet 300 Series & Olivetti JP's!	8	7-BKL
EPSON Stylus 400/800/800+/1000	8	1-BKL
EPSON Stylus Colour /PRO/XL	12	2-BKL
EPSON Stylus 820/colour II/III	12	23-BKL
EPSON Stylus Colour 200/300/400/500/600/800/850/1520	12	33A-BKL
EPSON Stylus Colour 440/460/480/640/660/700/740/760/900	12	33B-BKL
IBM/LEXMARK 4076/1000/1020/2000/2030/2050 Series	12	35A-BKL
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CANON BJC-210/212SP/240/255/265/1000 Series	3x12	25-CLR
CANON BJC-600/610/620	3x8	10-CLR
CANON BJC-2000/4000/4100/4200/4300/4550/5000/5500 BCI-21	3x30	17-CLR
CANON BJC-3000/6000/8000 Series	3x8	47-CLR
HP Colour Desk Jet 300/400/500 Series & Olivetti!	3x12	14A-CLR
HP Colour Desk Jet 600C/660C/690C Series	3x12	14B-CLR
HP Desk Jet 850C/855C/870C/1000C Series	3x3	30A-CLR
HP Desk Jet 710/720/890/900 Series	3x3	30B-CLR
EPSON Stylus Colour /PRO/XL	3x4	16-CLR
EPSON Stylus 820/colour II/III	3x12	24-CLR
EPSON Stylus Colour 200/300/400/500/600/800/850/1520	3x12	34A-CLR
EPSON Stylus Colour 440/460/480/640/660/700/740/760/900	3x12	34B-CLR
IBM/LEXMARK 4076/1000/1020/2000/2030/2050 Series	3x6	36A-CLR
IBM/LEXMARK 5000/5700/7000 & Z Series	3x6	36B-CLR
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Integrate ANY Fax (or Modem) into ANY telephone line for fully automatic fax reception. Operates with or without an answering machine. Just plug it into any telephone socket. Two models available.



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Choose FMX-PRO when you wish to fit a Modem to your Fax line and the Modem also needs to receive data calls. Directs Fax calls to your Fax and Data calls to Modem. Barge-in protection is provided to prevent one device interrupting the other while it is in use.



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### TELEPHONE CALL RECORDING AND OTHER APPLICATIONS

#### CALL RECORDING UNIT

Record your telephone calls to PC, or other recorder, from an ordinary single line or any multi-line phone system. Automatic operation with start/stop capability from any handset. PC software & cables supplied.



#### EASYPOLL MULTIPLE NUMBER

Operate Two numbers on one line. Auto-Connect will connect your Multiple number calls to one set of phones or answering machine and your Normal number calls to another set of phones or answering machine.



#### TWO LINE SELECTOR

Now you can connect TWO telephone lines (Teletex, Optus, ISDN or Tie Line) to one EFT-POS, Fax, Modem, Cordless Telephone, Answering Machine or any Telephone device. Receive incoming calls from either line. Make outgoing calls on either line.



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#### AUTOMATIC ATTENDANT

Our single line CALL ATTENDANT will answer your incoming calls after 4, 6 or 8 rings, play a greeting & message to your callers until you are able to answer. Also provides Message on Hold facility.



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#### REMOTE TELEPHONE ACTIVATOR

Call to Switch On, Switch OFF or RESET your PC, SERVER or any electrical equipment by telephone line using touch tone commands. RTA connects to any telephone line. Requires PCU or PCR accessory.



#### RTA-PRO VERSION

PRO version provides independent control of 2 separate outputs, with PIN number security. Status tones for each output are provided on answer. Shares an 8m line when used with the Multiple Number service.



#### POWER CONTROL UNIT

PCU connects direct to the RTA and also to your power socket, to allow telephone line dial in switching of the 240V supply connected to your equipment. Easy Plug In User Installation. Controls up to 10 Amps.



#### PC RESET UNIT

PCR connects to any PC to allow remote telephone PC RESET, or can also be used to turn ON/OFF PCs with ATX style motherboards. Easy User Installation.



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#### DOOR STATION UNIT

Will RING all of your telephones when a visitor arrives at your front door or gate. Answer to communicate. Open the door or gate with touch tones. Operates on any ordinary single line or multi-line phone system. Requires surface mount or flush mount door phone.



#### SURFACE MOUNT DOOR PHONE

This unit provides for quick and easy mounting direct onto any wall surface. Your visitor just presses the integral call button to ring your telephones. Provides clear 2 way communication as soon as you answer.



#### FLUSH MOUNT DOOR PHONE

This attractive Stainless Steel unit is designed for a flat recessed fit into your wall surface. Your visitor just presses the integral call button to ring your telephones. Provides clear 2 way communication as soon as you answer.



#### TELEPHONE CALL TRANSFER

Easy-Transfer allows you to answer a call on one telephone and then TRANSFER the call to another telephone fitted to the same line. Also provides INTERCOM facility. Uses your existing telephones.



### ARE YOUR PRODUCTS OR SERVICES WORTH TALKING ABOUT ?

#### TALKING DISPLAY UNIT

TDU will play 1 or more pre-recorded messages as soon it is triggered by a movement sensor, a switch, or at a preset time interval. Ideal for Product Promotions, Product Information, Message Warnings etc.



#### MULTIPLE INPUT UNIT

MUI allows for up to 12 separate movement sensors or switches to be connected to the TDU. Each sensor triggers its own unique message, output via any 8m line when used with the Multiple Number service.



#### SPEAKER SWITCHING UNIT

SSU allows for up to 12 separate speakers to be connected to the TDU so that each sensor triggers its own separate message, output on its own separate speaker. Background music can be played at all other times.



#### AUDIO SWITCHING UNIT

ASU allows the TDU to be connected to any existing PA or Background Music system. The existing PA or Background Music system is then muted or faded whenever a TDU message is broadcast and then reconnected when finished.



### TELEPHONE LINE SIMULATORS FOR TESTING, TRAINING, DEMONSTRATION

#### RINGMASTER STD

Will allow any 2 telephone devices to ring and communicate with each other, without the need to make costly calls and occupy 2 lines. Ideal for Testing, Training & Demonstration of all telephone devices.



#### RINGMASTER PRO

Provides all facilities of the STD model, and in addition provides Australian Dial Tone, Busy Tone and multiple ring outputs including FaxStream Duet & Multiple Number ring. Also available with USA, UK or other output.



#### RINGMASTER CLI

Provides all facilities of the PRO model and in addition will generate CallerID (Calling Number Display) output in conjunction with any Teletex ring pattern. Provides 10 preset outputs, plus Alphanumeric & user definable transmissions.



#### RINGMASTER INTERNATIONAL

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DESCRIPTION (50% Compatible with Printers listed below)	No. of Refills	Product Code
CANON B-I-30	60	20-BK1
EPSON B-I-3000/8050W	1	1-BKPL
CANON B-I-1020R/106/2020/2040/2040/2045/2050/1000	9	2-BKPL
CANON B-I-4000/1000	5	3-BKPL
CANON B-I-2000/4000/4100/4200/4300/4400/5000/5500/1000	1	4-BKPL
CANON B-I-2000/4000/4100/4200/4300/4400/5000/5500/1000	1	5-BKPL
CANON B-I-3000/4000/4100/4200/4300/4400/5000/5500/1000	12	6-BKPL
CANON B-I-6000/7000 Series - including Optimal®	6	43-BKPL
CANON B-I-6000/7000 Series	8	44-BKPL
CANON B-I-6000/7000 Series	8	BA-BKPL
HP Desk Jet 4600/4600 Series	8	60-BKPL
HP Desk Jet 600/6000 Series	8	29-BKPL
HP Desk Jet 300 Series and ColorJet JPL®	12	7-BKPL
EPSON Stylus 4000/6000/1000	12	1-BKPL
EPSON Stylus Color C/P/CXL	12	2-BKPL
EPSON Stylus Color C/P/CXL	12	23-BKPL
EPSON Stylus Color C/P/CXL	12	33A-BKPL
EPSON Stylus Color C/P/CXL	12	33B-BKPL
EPSON Stylus Color C/P/CXL	12	33C-BKPL
EPSON Stylus Color C/P/CXL	12	33D-BKPL
EPSON Stylus Color C/P/CXL	12	33E-BKPL
EPSON Stylus Color C/P/CXL	12	33F-BKPL
EPSON Stylus Color C/P/CXL	12	33G-BKPL
EPSON Stylus Color C/P/CXL	12	33H-BKPL
EPSON Stylus Color C/P/CXL	12	33I-BKPL
EPSON Stylus Color C/P/CXL	12	33J-BKPL
EPSON Stylus Color C/P/CXL	12	33K-BKPL
EPSON Stylus Color C/P/CXL	12	33L-BKPL
EPSON Stylus Color C/P/CXL	12	33M-BKPL
EPSON Stylus Color C/P/CXL	12	33N-BKPL
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EPSON Stylus Color C/P/CXL	12	33P-BKPL
EPSON Stylus Color C/P/CXL	12	33Q-BKPL
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EPSON Stylus Color C/P/CXL	12	33T-BKPL
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EPSON Stylus Color C/P/CXL	12	33W-BKPL
EPSON Stylus Color C/P/CXL	12	33X-BKPL
EPSON Stylus Color C/P/CXL	12	33Y-BKPL
EPSON Stylus Color C/P/CXL	12	33Z-BKPL
EPSON Stylus Color C/P/CXL	12	33AA-BKPL
EPSON Stylus Color C/P/CXL	12	33AB-BKPL
EPSON Stylus Color C/P/CXL	12	33AC-BKPL
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EPSON Stylus Color C/P/CXL	12	33KT-BKPL
EPSON Stylus Color C/P/CXL	12	33KU-BKPL
EPSON Stylus Color C/P/CXL	12	33KV-BKPL
EPSON Stylus Color C/P/CXL	12	33KW-BKPL
EPSON Stylus Color C/P/CXL	12	33KX-BKPL
EPSON Stylus Color C/P/CXL	12	33KY-BKPL
EPSON Stylus Color C/P/CXL	12	33KZ-BKPL
EPSON Stylus Color C/P/CXL	12	33LA-BKPL
EPSON Stylus Color C/P/CXL	12	33LB-BKPL
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EPSON Stylus Color C/P/CXL	12	33LD-BKPL
EPSON Stylus Color C/P/CXL	12	33LE-BKPL
EPSON Stylus Color C/P/CXL	12	33LF-BKPL
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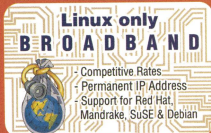
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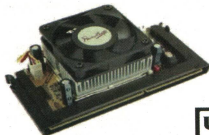
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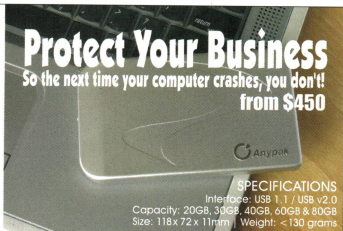
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RAM STD	256MB	256MB	256MB
HARD DRIVE	30GB	40GB	60GB
SCREEN	14.1" XGA TFT	14.1" XGA TFT	15" XGA TFT
MAX RESOLUTION	1024 x 768	1024 x 768	1024 x 768
VIDEO RAM (UMA)	16MB	16MB	16MB
CD-ROM/DVD	Combo	Combo	Combo
POINTING DEVICE	Touch Pad	Touch Pad	Touch Pad
56K v.90 & 10/100 LAN	Yes	Yes	Yes
WIRELESS LAN	Antenna Ready	Antenna Ready	Antenna Ready
WARRANTY	1 year	1 year	1 year
OP SYSTEM	Windows® XP Pro	Windows® XP Pro	Windows® XP Pro
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MOBILE PENTIUM M	1GHz	-	1.2GHz
RAM STD	256MB	256MB	256MB
HARD DRIVE	40GB	40GB	60GB
SCREEN	12.1" XGA	12.1" XGA	12.1" XGA
56K v.90 & 10/100 LAN	Yes	Yes	Yes
WIRELESS LAN	Intel 802.11b	Yes	Intel 802.11b
OPTICAL DRIVE	No	No	Combo
WEIGHT	From 1.1kg	1.8kg	From 1.8kg
OP SYSTEM	Windows® XP Pro	Windows® XP Tablet	Windows® XP Pro
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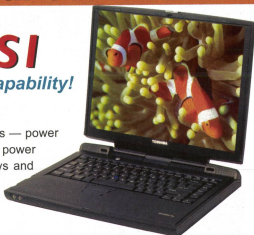
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SCREEN	14.1" TFT	14.1" TFT	15" TFT	15" TFT	15" TFT
MAX RESOLUTION	XGA	XGA	XGA	XGA	UXGA
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VIDEO RAM	32MB	32MB	32MB	32MB	32MB
56K v.90 & 10/100 LAN	Yes	Yes	Yes	Yes	Yes
WIRELESS LAN	Antenna	Antenna	Antenna	Antenna	Intel 802.11b
WARRANTY	1 year	1 year	1 year	1 year	1 year
OP SYSTEM	Windows® XP Pro	Windows® XP Pro	Windows® XP Pro	Windows® XP Pro	Windows® XP Pro
Rent*	\$29.72/wk (J7587)	\$33.69/wk (J7590)	\$35.68/wk (H2344)	\$39.50/wk (H2345)	\$49.60/wk (H2346)
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Communication	Modem, LAN
Wireless	802.11a/b Wi-Fi
Pointing Device	Touchpad and scroll
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Communication	56K V.92 Modem
Wireless	10/100 Ethernet and Intel Pro/Wireless 2100 Network Connection 802.11b
Pointing Device	Touchpad with scroll button
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- XP Pro

Click to DVD



Rent\* \$50.74/wk (J8821) **\$5,499**

### PCGTR1



- Pentium M 900MHz
- 10.6" WXGA Display
- DVD/CD-RW Drive
- Integrated Wireless LAN
- 30GB HDD
- 256MB RAM
- Built-in Camera
- USB2.0

Rent\* \$40.67/wk

(K0350) **\$4,299**

### PCGZ1RGP

- Pentium M 1.5GHz
- 512MB RAM
- 60GB HDD
- 14.1" SXGA Display
- DVD/CD-RW Drive
- Integrated Wireless LAN
- XP Pro

Rent\* \$42.56/wk (J8822) **\$4,499**

All VAIO models feature 56K modem, 10/100 LAN, i.LINK, USB and a full suite of multimedia software (including Photoshop Elements and Symantec Norton AntiVirus).

### PEGSJ22G

- Palm OS 4.1
- DragonBall VZ 33MHz
- 320 x 320 Colour Display
- 16MB Memory

(H9882) **\$449**



### CLiÉ

### PEGNX80XG

- Palm OS 5.0
- Intel PXA263 200MHz CPU
- 320 x 480 Display
- 1.3 Megapixel Camera
- Voice Record Function
- Integrated Keyboard
- ATRAC3/MP3 Audio Player
- Wireless LAN Expansion slot

(K1682) **\$Call**



### PEGSJ33G

- Palm OS 4.1
- Dragonball VZ 66MHz
- 320 x 320 Colour Display
- 16MB Memory
- ATRAC3/MP3 Audio Playback with earphones

(H0804) **\$549**

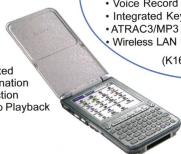


### PEGTG50G

- Palm OS 5.0 • Intel PXA250 200MHz
- 320 x 320 Colour Display • Integrated Bluetooth™ • Integrated Keyboard with illumination
- Voice Record Function
- ATRAC3/MP3 Audio Playback with earphones

Rent\* \$9.51/wk

(H9881) **\$849**



### PEGNZ90G

- Palm™ OS 5.0
- Intel PXA250 200MHz
- 320 x 480 Display
- 2.0 Megapixel Camera
- Integrated Bluetooth™
- Wireless LAN Expansion slot
- Integrated Keyboard
- ATRAC3/MP3 Audio Playback with earphones

Rent\* \$16.80/wk

(H0801) **\$1,499**



### VAIO

#### Port Replicators

#### PCGAPRV1

Port Replicator for PCGV505P



(I0317)

**\$490**

#### PCGAPRG1

Port Replicator for PCGGRT25 and PCGGRT30P



(J9361)

**\$490**

#### PCGAPRZ1

Port Replicator for PCGZ1RGP



(K1441)

**\$490**

#### RENTSMART

The figures quoted are based on a per week basis over 3 years. T.A.P. Terms & Conditions apply.

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All CLiÉ models feature memory stick slot, jog dial with back button and a full suite of multimedia software.

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Fax: 1300 13 6666 Email: [sales@ht.com.au](mailto:sales@ht.com.au)

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## Desktop solution

### HP Compaq Evo D330 ST

Not all items are in stock at all stores but can be ordered for Pick-up or Delivery

Delivery charges extra

Ask About...

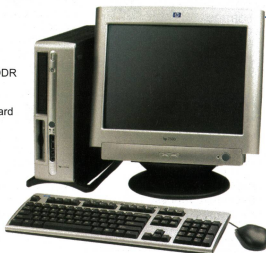


**HP Services Carepaq Upgrades:**  
Microsoft Operating System Application Telephone Support  
10 Call Pack (D6479) **\$1,699**  
25 Call Pack (D6480) **\$4,285**

#### RENTSMART

The figures quoted are based on a per week basis over 3 years. T.A.P. Terms & Conditions apply.

- Intel® Pentium® 2.4 GHz Processor with Hyper Threading (800MHz FSB)
- Intel® 865G Chipset
- Compact Slim Tower Chassis
- 256MB PC3200 (400MHz) Dual Channel DDR SDRAM (2 x 128MB)
- Integrated Intel Extreme Graphics 2
- 40GB 7200RPM Smart III Ultra ATA/100 Hard Disk Drive
- 48X/24X/48X CD-RW Drive
- 1.44MB Floppy Drive
- Soundmax Digital AC97 Integrated Audio with Internal Speaker
- Integrated Broadcom NetXtreme Gigabit Ethernet
- 6 x USB 2.0 ports (2 Front, 4 Rear)
- 2 x PS/2, 1 x Serial, 1 x Parallel Ports
- USB Easy Access Keyboard
- USB Optical Scroll Mouse
- DMI 2.0 compliant
- Microsoft® Windows® XP Professional
- Norton Anti-Virus 2003



Evo  
D330 ST

- P2.4GHz
- 40GB
- 256MB
- CDRW
- Win XP Pro.

DL375P#ABG

Monitor not included with Evo D330 ST Desktop

Rent\* \$15.68/wk (K0528) **\$1,399**

Compaq S7500 17" 1280x1024 CRT Display Monitor - 2 Tone (E5558) **\$389**

## Server solutions Improve your business efficiency with an HP server

### HP Server tc2120 Series For businesses setting up their First Client Server Network

- Intel® Pentium® 4 processor 2.66GHz (single processor)
- Integrated ATI Rage XL Video Controller with 8MB Video memory
- 256MB standard memory (4GB max)
- 36GB SCSI or 40GB ATA hard disk drive
- Up to 5 PCI expansion slots
- Integrated dual channel ultra ATA-100 IDE Adapter
- 250W Power Supply

tc2120 2.66/533,256MB 40GB ATA Rent\* \$18.43/wk (J5323) **\$1,645**

tc2120 2.66/533,256MB 36GB SCSI Rent\* \$23.48/wk (J5324) **\$2,095**

#### Or purchase a server solution!

A TC2120 SCSI server that is preloaded with windows 2000 Server including 5 Licenses

tc2120 2.66/533,256MB 36GB SCSI W2K bundle Rent\* \$35.68/wk (J5327) **\$3,595**

### HP ProLiant ML330 G3 Server

For businesses needing a Branch OfficeServer to run sophisticated small business applications

- Intel® Xeon 2.4GHz or 2.8GHz processor
- Integrated Single Channel Wide Ultra3 SCSI Adapter in PCI Slot
- 256MB standard memory (4GB max)
- 1 year warranty
- NC7760 PCI Gigabit Server Adapter (embedded)
- 4 PCI expansion slots

HP ProLiant ML330 G3 2.4GHz 36GB SCSI Model Rent\* \$22.32/wk (J2910) **\$2,249**

HP ProLiant ML330 G3 2.8GHz 36GB SCSI Model Rent\* \$28.73/wk (J2912) **\$2,895**

Optional Extras 3 year next Business day Onsite Warranty (F1130) **\$390**



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FINANCE METHODS ARE SUBJECT TO APPROVAL.



# Notebooks and Handheld

## HP Compaq nx9000 Business Notebook

- Intel Mobile Pentium 4 Processor 2.0GHz
- Bright and large 15.1" colour TFT XGA display
- Massive 40GB Hard Disk Drive
- 512MB DDR SDRAM
- 8 x DVD-ROM drive
- Integrated 802.11b wireless LAN, 56K/v.92 modem and 10/100 Ethernet
- Windows XP Professional

Rent\* \$30.71/wk (J5038) **\$3,095**



Not all items are in stock at all stores but can be ordered for Pick-up or Delivery

Delivery charges extra



### Notebook Accessories

HP  
Global Case  
(J8266)  
**\$120**

Compaq  
256MB DDR  
SDRAM  
(F1628)  
**\$175**

Compaq  
90W AC  
Adapter nx9000  
series  
(K0762)  
**\$80**

## HP Compaq nx7000

- Intel Pentium M 1.3GHz-M
- 15.4" Widescreen 1680 x 1050 CTF
- 40GB 5400rpm HDD
- 256MB DDR SDRAM
- DVD-ROM drive
- v.92/56K modem, Ethernet and Intel Pro 802.11b WLAN
- Windows XP Professional

Rent\* \$34.68/wk (K1344) **\$3,495**



**15.4"**  
Widescreen

## NEW HP iPAQ RANGE

### HP iPAQ H1930 Pocket PC

- Processor: Samsung S3C2410 203MHz
- 64MB RAM (56MB user accessible)
- TFT touch screen 240x320
- Audio: Built In
- Integrated SD/MMC Slot with SD I/O
- Battery: Advanced Lithium-Ion / 900mAh / Up to 8 hours
- Microsoft Pocket PC 2003
- One year limited warranty, parts & labour



(J8685) **\$499**

### HP iPAQ H1940 Pocket PC

- Processor: Samsung S3C2410 266MHz
- 64MB RAM (56MB user accessible)
- TFT touch screen 240x320
- Audio: Built In
- Integrated SD/MMC Slot with SD I/O
- Integrated Bluetooth
- Battery: Advanced Lithium-Ion / 900mAh / Up to 8 hours
- Microsoft Pocket PC 2003
- One year limited warranty, parts & labour



Rent\* \$6.71/wk (J8686) **\$599**

### HP iPAQ H2210 Pocket PC

- Processor: Intel XScale 400MHz
- 64MB RAM (56MB user accessible)
- TFT touch screen 240x320
- Audio: Built in, MP3 through headphones
- Integrated SD/MMC Slot with SD I/O, Compact Flash Type I and II
- Synchronization: Infrared, Bluetooth
- USB Desktop Charger
- Microsoft Pocket PC 2003
- One year limited warranty, parts & labour



Rent\* \$8.95/wk (J8687) **\$799**

### HP iPAQ H5550 Pocket PC

- Processor: Intel XScale 400MHz
- 128MB RAM (up to 17MB iPAQ File Store)
- 48MB ROM
- TFT touch screen 240x320
- Audio: Built in, MP3 through headphones
- Integrated SD/MMC Slot, supports SD I/O
- Synchronization: Infrared, Bluetooth, USB Charger
- Microsoft Pocket PC 2003
- One year limited warranty, parts & labour



Rent\* \$14.56/wk (J8688) **\$1,299**



### iPAQ Accessories

HP Auto  
Adapter  
(D9174)  
**\$65**

HP Secure  
Digital (SD)  
Memory Card  
128MB  
(E4026)  
**\$149**

AC Adapter  
(E0227)  
**\$45**

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## NEW! ThinkPad Notebooks

Not all items are  
in stock at all  
stores but can be  
ordered for Pick-up  
or Delivery

Delivery  
charges extra



Thinkpad  
256MB  
SDRAM  
(E4722)  
**\$129**

64MB  
USB 2.0  
Memory Key  
(I0304)  
**\$86**

ThinkPad  
A & T & X & R  
Series 72W  
AC Adapter  
(A1125)  
**\$99**

ThinkPad Port  
Replicator II  
(H1821)  
**\$329**

ThinkPad  
Deluxe Leather  
Carry Bag  
01R3605  
(F1410)  
**\$165**

### RENTSMART

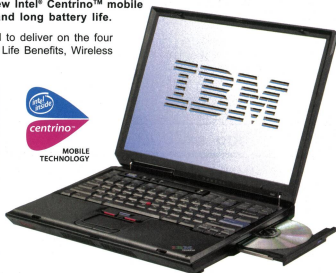
The figures  
quoted are based  
on a per week  
basis over 3  
years. T.A.P.  
Terms &  
Conditions apply.

### NEW! ThinkPad R40 Notebook

The new IBM ThinkPad R40 27229BM with new Intel® Centrino™ mobile technology designed for high performance and long battery life.

Intel® Centrino™ Mobile Technology is designed to deliver on the four vectors of mobility: Performance Benefits, Battery Life Benefits, Wireless Benefits and Form Factor Benefits.

ThinkPad R40	27229BM
Processor	Pentium® M 1.4GHz
RAM	256MB
Hard Drive	40GB
Screen	14.1" TFT
Optical Drive	DVD/CD-RW Combo
Modem/Ethernet	Yes
Integrated WLAN	802.11b
Security Chip	Yes
Op System	XP Professional
Battery	8 Cell Li-Ion
Warranty	1 year Parts & Labour



ThinkPad R40 27229BM

Rent\* \$29.76/wk (H2456) **\$2,999**

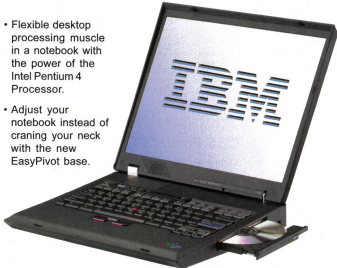
### NEW! ThinkPad G40 Notebook

The ThinkPad G Series offers desktop alternative functionality in a ThinkPad notebook for occasionally mobile users who need the flexibility to take work with them. ThinkPad G Series notebooks systems offer high performance and unique comfort features – all at an affordable price.

ThinkPad G40	23883JM
Processor	Pentium® 4 2.4GHz
RAM	256MB
Hard Drive	40GB
Floppy Drive	Yes
Screen	15" XGA TFT
Optical Drive	DVD/CD-RW Combo
Modem/Ethernet	Yes
Expansion	1 x Parallel, 4 x USB 2.0 1 x VGA, Audio, 1 x PC Card Type III
Op System	XP Professional
Battery	12 Cell Li-Ion
Warranty	1 year Parts & Labour

- Flexible desktop processing muscle in a notebook with the power of the Intel Pentium 4 Processor.

- Adjust your notebook instead of craning your neck with the new EasyPivot base.



ThinkPad G40 23883JM

Rent\* \$26.78/wk (J3517) **\$2,699**

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TECHNOLOGY™



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# Reliability, stability & room to grow

The Ipex T200, powered by Intel® Pentium® 4 processor technology, is ideal for the small business user looking for a system with the performance and expansion capabilities to grow and adapt with your needs.

## • Ipex T200 XL Rexburg2

- Intel® T200 Tower
- Intel® Pentium® 4 processor 2.66Ghz
- 256 DDR RAM 2700 memory
- 60GB 7200 RPM
- 10/100 Ethernet OnBoard
- USB 2.0 OnBoard
- GeForce4 MX440 64MB with TV Out
- CDRW

- Internal 56K modem
- Wireless Mouse & Keyboard
- Microsoft® Windows® XP Home
- OEM Microsoft® Works 7.0
- OEM Symantec NAV
- OEM Nero Burning ROM
- 1year return to base warranty



### With 17" CRT Monitor

Rent\* \$20.16/wk (J9551) **\$1,799**

### With 15" TFT Monitor

Rent\* \$21.28/wk (J9552) **\$1,999**

## • Ipex T200 XL Rexburg2 2.80

- Intel® Pentium® 4 processor 2.80Ghz
- 512MB DDR RAM PC2100 memory
- 80GB 7200 RPM
- 10/100 Ethernet
- USB 2.0 OnBoard
- GeForce4 MX440 64MB with TV out
- CD-RW/DVD COMBO DRIVE

- Internal 56K modem
- Wireless Mouse & Keyboard
- Microsoft® Windows® XP Home
- OEM Microsoft® Works 7.0
- OEM Symantec NAV
- OEM Nero Burning ROM
- 1year return to base warranty



### With 17" CRT Monitor

Rent\* \$24.60/wk (J9555) **\$2,195**

### With 15" TFT Monitor

Rent\* \$24.76/wk (J9556) **\$2,495**

## • Ipex T200 XL Rexburg2 2.80

- Intel® Pentium® 4 processor 2.80Ghz
- 512MB DDR RAM PC2100 memory
- 120GB 7200 RPM
- 10/100 Ethernet OnBoard
- USB 2.0 OnBoard
- GeForce4 Ti4200 128MB with TV out
- Sony DVD +/- RW
- Internal 56K Modem

- Wireless Mouse & Keyboard
- Microsoft® Windows® XP Home
- OEM Microsoft® Works 7.0
- OEM Symantec NAV
- OEM Nero Burning ROM
- 1year return to base warranty



### With 15" TFT Monitor

Rent\* \$27.74/wk (J9557) **\$2,795**

## • Ipex Convergence™ XL Rexburg2 2.40

- Intel® Pentium® 4 processor 2.40Ghz
- 256MB DDR RAM
- 40GB HDD 7200RPM
- CD-ROM
- Integrated Intel Extreme Graphics Onboard
- Sound Onboard
- 10/100 LAN Onboard
- USB 2.0 Onboard

- Ipex Mouse & keyboard
- 3.5" 1.44MB Floppy drive
- Microsoft® Windows® XP Professional
- OEM Symantec NAV
- 3 Years Return to base Warranty



### With 15" TFT Black Monitor

Rent\* \$21.28/wk (J0475) **\$1,899**

## • Ipex Dualine XL 15"

- Intel® Celeron® processor 2.50Ghz
- 512MB 2700 PC2100 DDR memory
- 30GB hard drive
- Integrated LAN
- 32MB onboard video
- 15" TFT
- Integrated sound

- CD-Rom
- 56K integrated modem
- Microsoft® Windows® XP Home
- 1 year return to base warranty
- **Battery Not Included**

Rent\* \$21.28/wk (J9562) **\$1,899**



**Ipex recommends Microsoft® Windows® XP.**

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**Delivery charges extra**

Need to configure a PC to your own needs? Call Harris Technology on 1300 13 9999

**Ipex  
CentraNAS  
320**

**(Network  
Attached  
Storage)  
Appliance**



**HARD DISK  
(7200RPM)  
8 x 40GB**

**RAW  
CAPACITY  
320GB**

**CAPACITY -  
Raid 5 + Hot  
Spare Drive  
240GB**

Rent  
\$43.42/wk  
(J2711)

**\$4,590**

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# Get Mobile... Get Targus

## HOT ACCESSORIES

High quality USB Hubs. Compact & lightweight. True plug & play.  
Full-speed & low-speed transfer rates



### Micro USB 2.0 Hub

- High Speed 4 Port Hub
- AC Adapter included

PA053F (H2073) **\$82**



### Micro USB 4 Port Hub

- USB 1.0 Micro USB 4 Port Hub
- Lights up blue when plugged in

PA055U (F0749) **\$37**

## Optical Notebook Mouse



**NEW!**

- Small, compact design is ideal for travel yet big enough for desktop use
- Ergonomic - comfortable for left or right-handed users
- Free carrying pouch for ease of travel

PAUM004U (K0620) **\$49**

## Side access Traditional Roller



**NEW!**

- Side entry notebook compartment
- Meets most airlines' overhead compartment restrictions
- Removable slip case included
- Locking telescope handle
- Spacious clothing compartment

OCN700 (K0624) **\$199**

## NOTEBOOK CASES & BACKPACKS

Introducing two new stylish and lightweight backpacks suitable for large sized notebooks



**NEW!**

### Pulse backpack

- Spacious main compartment for your notebook and accessories
- Fits up to 15" screens
- Contoured ergonomic shoulder straps with 3D air-mesh padding

RGO335 (K0622) **\$79**



**NEW!**

### Sportline Deluxe Backpack in Red

- Weather proof flap
- Heavy-duty fabrics with nylon webbing reinforcement
- Also available in blue (TB315/F0754)

TSB314 (K0623) **\$149**

CityLite Range. New Ultra-lightweight and flexible cases for maximum carrying comfort



### Dash

- Includes zip-down workstation
- Slipover strap to attach to luggage
- Accessory and File pockets
- Also available in grey (H9774)

CCL105 (H9598) **\$55**



### Sprint

- Includes zip-down workstation
- Slipover strap to attach to luggage
- Accessory and File pockets
- Includes an expanding file section
- Also available in platinum (H9775)

CCL205 (H9600) **\$72**



### Swift

- Water resistant
- Constructed of lightweight, flexible materials for maximum carrying comfort

CNS012 (H9601) **\$49**

Not all items are in stock at all stores but can be ordered for Pick-up or Delivery

Delivery charges extra

## PDA ACCESSORIES



Universal Slip Case  
CHUS01 (H9604) **\$12**



Universal Organiser  
PDAT01 (H9610) **\$20**



Universal Organiser Sport  
PDAT05 (H9611) **\$16**



Tri-Fold Universal PDA Case (Leather)  
CH072 (K0625) **\$29**



Tri-Fold Universal PDA Case (Nylon)  
CH071 (K0626) **\$24**

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# Power Back Up = Power Protection

## Back-UPS ES 350/500

### Affordable battery backup

APC Back-UPS ES 350/500 is an affordable battery backup to provide continued uptime and hardware protection for home and home office. Three battery and surge, two surge only outlets, phone, modem, fax and DSL data line surge protection, computer interface port for USB communications and ships with file saving and auto-shutdown software. 2 year warranty.

IDEAL FOR:



**\$150,000**  
Lifetime Connected Equipment Protection!



Back-UPS ES 350va (E1093) **\$229**

Back-UPS ES 500va (E0709) **\$289**

## Back-UPS RS for Workstations

### Smart battery backup & high performance surge suppression

Including additional outlet for protection of printers, audible alarms, phone/modem protection, user replaceable hot swappable batteries. PowerChute® Plus software.

IDEAL FOR:



**\$200,000**  
Lifetime Connected Equipment Protection!

RS 500VA

APC Back-UPS RS 500VA (H2003) **\$339**

APC Back-UPS RS 1000VA  
Rent\* \$8.95/wk (J5134) **\$799**

## Smart-UPS with USB Support

### Smart-UPS 1000VA, 1500VA

Smart-UPS protects your data by supplying network-grade battery backup when power fails. PowerChute® Plus software will safely store data and shut down your network operating system before the battery is fully discharged. APC Smart-UPS is the perfect UPS for file servers, minicomputers, Internet hubs, telecom systems and other mission-critical applications.

IDEAL FOR:



APC Smart-UPS 1000VA  
Rent\* \$12.87/wk (D9337) **\$1,149**

APC Smart-UPS 1500VA  
Rent\* \$16.75/wk (D4218) **\$1,495**

## Smart-UPS Rackmount

### Smart-UPS 750VA, 1000VA

APC's slim line rack-mount Smart-UPS deliver premium uninterruptible power and the most advanced performance features available. With PowerChute® plus software the uninterruptible power supply (UPS) will safely store data and shut down your network operating system before the battery is fully discharged, whether you're there or not. SmartSlot internal accessory slot allows you to install optional accessories to enhance the performance of your UPS.

IDEAL FOR:



APC Smart-UPS 750VA  
Rent\* \$13.73/wk (H0659) **\$1,225**

APC Smart-UPS 1000VA  
Rent\* \$17.92/wk (H0660) **\$1,599**

Not all items are in stock at all stores but can be ordered for Pick-up or Delivery

Delivery charges extra

**APC**



PNote Pro (99592)

**\$69**



**\$50,000**  
Lifetime Connected Equipment Protection!

Surge Arrest 5 Strip (A0098)

**\$85**



APC Symmetra Power Array 8kVA, exp. to 16kVA (71087)

Rent\* \$119.96/wk

**\$14,799**

**RENTSMART**

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## Networking Solutions

Not all items are in stock at all stores but can be ordered for Pick-up or Delivery

Delivery charges extra

### Wireless Antennae

**DWL-50AT**  
Omni directional indoor antenna upto 500M

(F5424) **\$38**

**DWL-M60AT**  
Directional Indoor Panel antenna upto 500M

(F5427) **\$113**

**DWL-R60AT**  
Directional Indoor Microstrip antenna upto 500M

(G2082) **\$56**

**ANT24-0401**  
Omni-directional Indoor ceiling mount antenna upto 500M

(G5591) **\$218**

**ANT24-1400**  
Directional Outdoor Antenna upto 3Km

(F5426) **\$349**

**ANT24-2100**  
Directional Outdoor Antenna upto 10Km

(J5344) **\$537**

### High Quality Video Conferencing for Home and Office

#### DVC-1000 VideoPhone

The D-Link DVC-1000 VideoPhone introduces the world of video conferencing over the Internet, to bring you and your family, friends and colleagues together. Since the DVC-1000 VideoPhone is a stand-alone device, you do not need a computer to video conference over the Internet. Compatible with Net Meeting or any product that supports Net Meeting.



Rent\* \$7.79/wk (K1300) **\$695**

### AirPlus XtremeG™ 11/54Mbps Wireless Solutions

New series of high-speed devices capable of transfer rates up to 54Mbps. And with the new AirPlus Xtreme G DWL-2000AP Wireless Access Point, D-Link once again sets a new standard for wireless access points. It includes an embedded DHCP server that once enabled will automatically assign IP addresses to wireless clients. This unique feature makes the DWL-2000AP an ideal solution for quickly creating and extending a wireless local area network (WLAN) in offices or other workplaces, or even at trade shows and other special events.

**AirPlus XtremeG™**



**DWL-G520**  
Wireless PCI adapter (H9622) **\$169**



**DWL-G650**  
Wireless PCMCIA cardbus (H9621) **\$139**



**DWL-2000AP**  
Wireless Access Point (H9623) **\$295**



**DI-624**

(J4539) **\$325**

The DI-624 features the very latest in advanced wireless silicon chip technology including enhanced security to shield and protect your wireless communication from intruders. It also includes D-Link's own robust firewall security features. The DI-624 is ideal for those creating their first wireless network, as well as for more advanced users looking for additional management settings and policy-based content filtering. Filters can be set based on MAC address, IP address, URL and/or Domain Name.

### 22Mbps Wireless Network

**DWL-650+**  
AirPlus™ 22 Mbps Wireless LAN PCMCIA adapter



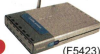
(F5422) **\$95**

**DWL-520+**  
AirPlus™ 22 Mbps Wireless LAN PCI Adapter



(F5421) **\$119**

**DWL-900AP+**  
AirPlus™ 22 Mbps Wireless LAN Access Point



(F5423) **\$229**

**AirPlus**

### Cable & DSL Routers/Gateways & Modems

#### DSL-302G

USB/Ethernet Combo ADSL Modem - with NAT+ DHCP

(J4248) **\$229**



#### DSL-300+

External ADSL Ethernet Modem with a single 10Mbps Ethernet Port

(G2081) **\$219**

**DSL-604+** Wireless ADSL Router, all-in-one networking device that provides broadband Internet connection, wireless user access and dedicated LAN bandwidth server connection.



(G8729) **\$479**

**DI-614+** AirPlus 22Mbps Wireless IP router for Cable & DSL modems with 22Mbps wireless access point and 4 Port 10/100 switch



(G0229) **\$239**

**DI-714P+** 22Mbps Wireless IP Router for DSL/Cable Modems with 4 Port Switch & Single Port Print Server

(G9644) **\$355**

**DI-764** 11/22/54Mbps Wireless IP Router for DSL/Cable Modems with 4-Port Switch



Rent\* \$7.61/wk (G9645) **\$679**

#### DI-704P

IP Router for DSL/ Cable Modems with 4 Port Switch & Single Port Print Server

**Built-in Bigpond Cable Login**

(E5861) **\$149**

#### DI-707P

IP Router for DSL/Cable Modems with 7 Port Switch & Single Port Print Server

**Built-in Bigpond Cable Login**

(E7329) **\$210**

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## Make the switch - right product right price

### Managed Switches

#### DES-3226S\*

24 Port 10/100 Layer 2 Managed,  
Stackable Switch with Optional  
Gigabit/Fibre modules

(F9634) **\$1,479**

#### DES-3326S\*

24 Port 10/100 Layer 3 Managed, Stackable  
Switch with Optional Gigabit/Fibre modules



(G3828) **\$3,595**

#### BONUS\*

12 MONTH "STANDARD" ONSITE  
MAINTENANCE AGREEMENT  
(at no extra cost)

Valid for purchases until 30 September 2003



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### 10/100Mbps Rackmount Switches

#### DES-1016R+

16 Port 10/100 Unmanaged  
switch with Optional Fibre  
module



(D4164) **\$394**

**\$50**  
CashBack

#### DES-1218R

16-Port 10/100Mbps  
Unmanaged Switch  
with optional Gigabit/  
Fibre Modules

(E7773) **\$709**

**\$50**  
CashBack

#### DES-1010G

8 Port 10/100  
Switch with  
2 built-in  
Gigabit ports



(K0492) **\$429**

**\$50**  
CashBack

Only available  
on selected  
marked items

Part No#  
D4164, E3669,  
E7773, E7388,  
H1560 Valid  
from 01 August  
until 30  
September 2003

The following  
must be sent to  
D-Link, no later  
than the  
15 October 2003

- The sticker  
from the box
- Original or  
photocopy of  
the store receipt
- The barcode  
from the bottom  
of the box (Cut  
out) - Name,  
address, phone  
number, email  
and address

Sent to D-Link  
Cash Back  
Offer  
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North Ryde  
NSW 2113

Terms &  
Conditions apply

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#### DES-1024R+

24 Port 10/100 Unmanaged  
switch with Optional Fibre  
module



(E3669) **\$649**

**\$50**  
CashBack

#### DES-1226R

24-Port 10/100Mbps  
Unmanaged Switch  
with optional Gigabit/  
Fibre Modules

(E7388) **\$828**

**\$50**  
CashBack

#### DES-1026G

24 Port 10/100 Unmanaged  
switch with 2 x built in  
gigabit ports



(H1560) **\$984**

**\$50**  
CashBack

### 10/100/1000 Gigabit Switches

#### DGS-1004T

4 Port 10/100/1000  
Unmanaged gigabit switch

(G3818) **\$595**

#### DGS-1008T

8 Port 10/100/1000  
Unmanaged gigabit switch

(D9338) **\$999**

#### DGS-1016T

16 Port  
10/100/1000  
Unmanaged gigabit switch

(G3825) **\$2,595**

#### DGS-1024T

24 Port 10/100/1000  
Unmanaged gigabit switch  
with 2 Combo Mini-GBIC  
ports

(G1968) **\$3,290**

### 10/100Mbps Desktop Switches

#### DES-1005D

5 Port 10/100 Switch

(85101) **\$89**

#### DES-1008D

8 Port 10/100 Switch

(98254) **\$125**



#### DES-1016D

16 Port 10/100 Switch  
(Rackmount kit incl)

(F0915) **\$229**

#### DES-1024D

24 Port 10/100 Switch  
(Rackmount kit incl)

(G1783) **\$417**



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# NETGEAR™

HT Web Direct

[www.ht.com.au/cat/netgear](http://www.ht.com.au/cat/netgear)

## Everybody's Connecting

Not all items are in stock at all stores but can be ordered for Pick-up or Delivery

Delivery charges extra

### Managed Switches

These Managed Switches from NETGEAR provide a complete solution with all core components already built in. They provide complete Layer 2 management including SNMP, RMON, VLAN, QoS, Port Trunking, Radius and more. NETGEAR now also offer premium service and support options for businesses.

Next business day exchange warranty FREE with these products see [www.netgear.com.au](http://www.netgear.com.au) for details

#### FSM726

FSM726



24 Ports 10/100Mbps, 2 x copper gigabit ports or 2 x GBIC slots. Rent\* \$14.10/wk (J2423) **\$1,258**

#### FSM726S

24 Ports 10/100Mbps, 2 x copper gigabit ports or 2 x GBIC slots, non-blocking backplane, stackable. Rent\* \$15.35/wk (D8885) **\$1,370**

FSM750S 48 Ports 10/100Mbps, 2 x copper gigabit ports or 2 x GBIC slots, non-blocking backplane, stackable. Rent\* \$29.36/wk (G4121) **\$2,959**

#### GSM712

FSM750S



10 ports 10/100/1000Mbps switch with 2x GBIC slots. Rent\* \$37.00/wk (F4112) **\$3,728**

#### GSM712F

12 port gigabit fibre switch (8 fibre and 4 copper built in, with option to have all 12 fibre). **NEW**

GSM7324 layer 3 switch 20 x 10/100/10000, 4 GBIC/GTP ports **NEW**

Rent\* \$49.46/wk (J6553) **\$5,360**

Rent\* \$75.42/wk (J6587) **\$8,995**

### Network Cards

**GA302T**  
Netgear  
GA302T  
Copper Gigabit  
Adaptor  
(D4118)  
**\$72**

**FA311**  
Ethernet  
Adaptor  
10/100Mbps  
PC  
(A1372)  
**\$29**

**FA511**  
10/100Mbps  
CardBus PC  
Card  
(No dongle  
required)  
(D4112)  
**\$89**



### Unmanaged Switches

#### FS726AT

24-Port 10/100 Switch w/Copper Gigabit Module Rent\* \$12.87/wk (J6158) **\$1,149**

#### FS750AT

48-Port 10/100 Switch w/Copper Gigabit Module Rent\* \$12.87/wk (J6588) **\$1,149**

### Compact Ethernet Switches

#### FS105

5 Port 10/100Mbps Ethernet Switch (84722) **\$97**

#### FS108

8 Port 10/100Mbps Ethernet Switch (70905) **\$146**

#### FS116

16 Port 10/100Mbps Ethernet Switch (A5347) **\$209**

### Rackmount Ethernet Switches

#### FS516

16 Port 10/100Mbps Ethernet Switch (60522) **\$482**

#### FS524

24 Port 10/100Mbps Ethernet Switch (77549) **\$539**

### 10/100 Switches

#### JFS516

16 Port 10/100 Mbps Fast Ethernet Switch (J4793) **\$343**

#### JFS524

24 Port 10/100Mbps Ethernet Switch (H5214) **\$437**

### Gigabit Switches

These unmanaged gigabit switches from NETGEAR provide lightening fast 10/100/1000 connections. All ports are automatic speed and full/half duplex sensing.

Next business day exchange warranty FREE with these products see [www.netgear.com.au](http://www.netgear.com.au) for details

#### GS105

5 Port 10/100/1000Mbps gigabit switch. Rent\* \$Call/wk (K1073) **\$Call**

#### GS108

8 Port 10/100/1000Mbps gigabit switch. Rent\* \$10.07/wk (H1741) **\$899**

#### GS516T

16 port 10/100/1000Mbps gigabit switch. Rent\* \$22.20/wk (D5960) **\$2,237**

#### GS524T

24 Port 10/100/1000Mbps gigabit switch. Rent\* \$29.87/wk (D5961) **\$3,010**

GS516T



GS524T



### RENTSMART

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# NETGEAR™

HT Web Direct

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## Wireless Solutions

### Firewall and VPN Routers

NETGEAR offer a complete range of ProSafe firewall routers which include SPI, DoS, logging and reports and alerts. All routers support VPN passthrough, content filtering and VPN endpoint termination is available on certain products.

**RP614** Cable/DSL Web Safe Router with  
4 x 10/100 Mbps switch (F9645) **\$149**

**FR114P** Cable/DSL ProSafe firewall router,  
print server, 4 x 10/100 switch, ICSA Certified. (F0902) **\$215**

**FVS318** Cable/DSL ProSafe firewall router,  
8 VPN tunnels, 8 x 10/100 switch (F0242) **\$285**

**FM114P** Cable/DSL ProSafe Wireless router, 802.11b  
access point, print server, 4 x 10/100 switch (F0904) **\$355**

**FR328S** Cable/DSL ProSafe firewall router, serial port  
for automatic fail over, 8 x 10/100 switch (G6240) **\$369**

**FWAG114** ProSafe 54 Mbps a/b/g Wireless VPN Firewall  
with 4 x 10/100 switch Rent\* \$7.38/wk (J4686) **\$659**

**FVL328** Cable/DSL ProSafe firewall router, 100 VPN  
tunnels, 8 x 10/100 switch Rent\* \$11.08/wk (G8576) **\$989**

**FVM318** Cable/DSL ProSafe firewall, 802.11b Wireless access point,  
upto 102 VPN tunnels over WLAN and WAN,  
8 x 10/100 switch Rent\* \$18.20/wk (G8578) **\$1,624**

**Hot Product**

RP614



FM114P



FVM318



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### Broadband Access

**DG824M**

DSL modem  
router with  
wireless  
access  
point,  
firewall and  
4 port 10/  
100 switch

(G8580)

**\$429**

**DG814**

DSL modem  
router with 4  
port  
10/100  
switch

(F5181)

**\$275**

**DM602**

DSL modem  
router with  
USB  
and Ethernet

(F9650)

**\$199**

### Wireless Solutions

NETGEAR's wireless products supports 54 Mbps 802.11g\* and 802.11b as well as 802.11a ensuring the maximum freedom of movement, flexibility and maximum throughput in all situations.

**11 Mps**  
**MA521**  
11Mbps 802.11b wireless PC card (J4550) **\$99**

**MA111**  
802.11b Wireless USB Adapter (H9137) **\$129**

**MR814**  
DSL Router 11Mbps 802.11b Cable (H1735) **\$229**

**54 Mps**  
**WG511**  
11/ 54Mbps wireless PCMCIA card (H9581) **\$139**

**WG311**  
11/ 54 Mbps Wireless PCI Card (J8554) **\$159**

**WGE101**  
11/ 54 Mbps Wireless Ethernet bridge (J8566) **\$225**

**WAG511**  
11/ 54Mbps a/b/g tri band PC card (H9135) **\$245**

**WG602**  
11/ 54Mbps wireless access point (H9579) **\$259**

**WGR614**  
11/ 54Mbps Cable/DSL Wireless Router (J2416) **\$299**

ANTENNAS Now available!  
Check [www.ht.com.au](http://www.ht.com.au)  
for details.



MA111

WAG511



WG602



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## Wireless Solutions

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### NetComm 11b-11Mbps Wireless Networking

NP6800 Wireless Access Point



(H2189)

**\$169**

NP7032 Wireless PC Card



(H2060)

**\$69**

NP7042 Wireless USB Adaptor



(H2064)

**\$99**

## NetComm 11g-54Mbps Wireless Networking

Designed around the recently ratified IEEE 802.11g standard for Wireless Networking, NetComm's new range of Wireless Networking products deliver transfer rates of up to 54Mbps while maintaining backwards compatibility with earlier 802.11b-11Mbps wireless systems. Incorporating the latest developments in wireless technology, NetComm has ensured your data will always be secure with 128-bit WEP encryption and MAC Address Authentication\*. NetComm products are designed and engineered in Australia for Australian conditions and are backed by our 20 years of experience in delivering communication solutions to the Australian market.

### NB5540 All-in-one Advanced Firewall, 2.4GHz Wireless & VPN Router

Wireless



**NEW**

(J8540) **\$319**

NB5540

**Wireless Router**

BROADBAND FIREWALL & VPN ROUTER SWITCH

- Scorching transfer rate of up to 54Mbps with auto-fallback for 11b systems.
- Enhanced Security Firewall - SPI, DOS and URL filtering.
- 5 simultaneous Endpoint VPN Tunnels.
- ADSL/Cable Router with 4 Port 10/100 Switch.
- UPnP, Diagnostics, Backup & Restore configuration

### NP5400 - 11g-54Mbps Wireless Access Point

- Scorching transfer rate of up to 54Mbps with auto-fallback for 11b systems.
- Flexible Integration for Infrastructure and Client modes.
- Data security with the latest 128-bit WEP encryption & MAC Address Authentication.
- Removable antenna for greater installation flexibility.

(J8479) **\$319**

**NEW**



### NP5430 - 11g-54Mbps Wireless PC-Card

- Scorching transfer rate of up to 54Mbps with auto-fallback for 11b systems.
- 32-bit CardBus technology.
- Data security with the latest 128-bit WEP encryption.
- Low power consumption design.

(J8480) **\$149**

**NEW**



## NetComm Print Servers

### NP3640 Fast Ethernet Mini Print Server

Fully 10/100 compliant and compatible with most parallel port printers this versatile print server supports 5 major protocols; TCT/IP, NetBEUI, IPX/SPX, SMB and AppleTalk.

(J4656) **\$209**



### NP5300PS Fast Print Server

This three port print server lets all LAN users share up to three printers without taxing any one PC's resource.

(92346) **\$398**



## NetComm Gigabit Solutions

### NP2005

5 port 10/100 auto-sensing switch



(D0966) **\$99**

### NP2008

8 port 10/100 auto-sensing switch

(D0967) **\$119**

### NP2160

16 port 10/100 auto-sensing professional switch (19-inch rack-mount kit)

(E7322) **\$395**



### NP2240

24 port 10/100 auto-sensing professional switch (19-inch rack-mount kit)



(E7323) **\$489**

### NP2480

26 port 10/100 Gigabit switch, 24 10/100Mbps auto-sensing and 2 1000Base-SX Copper Gigabit Ethernet Port (19-inch rack-mount kit)



Rent\* \$16.70/wk

(F9533) **\$1,490**

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# High Speed Internet Access

## ADSL Modems with NetComm

### NB1300 ADSL (USB/Ethernet) Modem Router

High speed ADSL modem with both Ethernet & USB connectivity. Fully featured NAT router. Approved for connection to Telstra's ADSL network. New features include SNMP & Telnet.

**New Features:**

- SNMP
- Telnet
- Three step one page setup



(K0670) **\$199**

Voucher inside gives you  
**\$50 FREE** ihug ADSL

[www.ihug.com.au/adsl](http://www.ihug.com.au/adsl)  
while stock last  
Terms & conditions apply

### NB1200 ADSL USB Modem

High Speed ADSL modem with USB connectivity. Approved for connection to Telstra's ADSL network.



(F8602) **\$129**

### NB3300 ADSL Modem / Router / 4-port switch

Integrated ADSL modem and router with 4 port 10/100 switch.

- Easy web interface
- NAT security and internet sharing
- Supports PPPoA, PPPoE, PPTP



(F3590) **\$399**

## NetComm Cable / ADSL Routers

### NB1100COMPACT Broadband Firewall Router with 10/100 4 port switch

router



(J4636) **\$279**

Advanced Firewall router for ADSL/Cable Internet sharing

### NB3200 Cable / ADSL VPN Router 4-port switch

- Provides full IPSec VPN tunnelling
- NAT firewall protection
- Supports up to 70 simultaneous VPN tunnels
- 4-port 10/100 switch
- Easy web interface



(F3586) **\$389**

### NB3000 Cable / ADSL Wireless Router with 10/100 4-port switch

- 4-port 10/100 switch
- NAT firewall protection
- Wireless range up to 90 metres indoors!
- Works with major Australian ISP's - Cable, ADSL.

Wireless speeds and range may vary depending on locations.



(F3588) **\$269**

### NB2800 Cable / ADSL Router with 10/100 4-port switch

- Built-in DHCP server
- NAT firewall protection
- VPN pass-through
- Quick & easy to install



(H2086) **\$149**

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Delivery charges extra

### Fast Ethernet Adaptors

**NP1100**  
32-bit 10/100 PCI LAN Adapter  
(C7657) **\$199**

**NP1200**  
32-bit 10/100 Ethernet PC Card  
(D1166) **\$99**

**NP1010**  
USB LAN Key 10/100 Fast Ethernet Adaptor  
(C7651) **\$68**

**NP1300**  
10base-T Compact Flash LAN Adaptor. with PCMCIA adaptor  
(D4201) **\$129**

**NP1800**  
32-bit PCI Gigabit Gigabit N.I.C (G6483) **\$114**

**NP1500**  
32-bit INTEL 10/100Mbps network card  
(G6482) **\$95**

**NP1880**  
32/64-bit PCI Gigabit Network Card Gigabit N.I.C (G6484) **\$132**

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## Possible made practical

**NEW** 3Com Wireless

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Delivery charges extra

3Com

3Com X-JACK 802.11b Wireless PC/MCIA (retractable aerial)

(D5753)  
**\$89**

3Com USB Bluetooth Adapter

(K1074)  
**179**

3Com Network Jack 4Port 10/100

(K1075)  
**279**

3Com OfficeConnect 10/100 NIC

(K0185)  
**\$44**

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The 3Com OfficeConnect Wireless 11g family of products is perfect for small offices, home offices, or any enterprise setting where low price is a consideration. The OfficeConnect Wireless 11g products are among the first to ship with full IEEE 802.11g standardization and new Wi-Fi Protected Access (WPA) security.



11g PC Card

**The 3Com® OfficeConnect® 11g Wireless PC Card** for high speed, reliable 802.11g wireless connections with speeds up to 54 Mbps. Includes 256-bit WPA encryption and 128-bit WEP encryption for security.

(K0052) **\$145**



11g Access Point

**The 3Com® OfficeConnect® 11g Wireless Access Point** provides speeds up to 54 Mbps and has 256-bit WPA encryption and 128-bit WEP encryption to help keep data secure.

(K0053) **\$269**



11g Cable/DSL Gateway

**The 3Com OfficeConnect Wireless 11g Cable/DSL Gateway** provides robust routing and security features and allows wireless and wired users to economically share a single broadband connection.

(K0055) **\$315**

**NEW** 3Com Gigabit Switch

The 3Com® OfficeConnect® Gigabit Switch 5 is designed for small or remote branch offices that need to run bandwidth-intensive video or multimedia applications, and connect to high-speed servers or a high-speed network backbone. Use it to upgrade your network when you get a Gigabit speed workstation.



5 Port Gigabit Switch

**The 3Com® OfficeConnect® 5 Port Gigabit Switch** is designed for small or remote branch offices that need to run bandwidth-intensive video or multimedia applications, and connect to high-speed servers or a high-speed network backbone. The five-port gigabit switch is powerful, as well as reliable and simple to install and operate. Plug-and-play convenience means the switch works right out of the box with no configuration or management required.



(K0056) **\$495**

**3Com SuperStack 3 Baseline Switch**

3Com SuperStack 3 Baseline switches provide powerful, feature-rich practicality in a sturdy package designed for reliability, long life, and low total cost of ownership



24 Port 10/100 Switch

**The 3Com® SuperStack® 3 Baseline 10/100 Switch 24-Port** is an unmanaged, nonblocking switch designed for small to midsize offices. This rack mountable, business-class switch can be installed in a wiring closet or as a free-standing unit. The switch comes preconfigured for fast, easy installation. Any of the switch's 24 ports can deliver 10BASE-T Ethernet, or 100BASE-TX Fast Ethernet.

Rent\* \$6.27/wk (G8704) **\$560**

\* The figures quoted are based on a per week basis over 3 years. T.A.P. Terms and Conditions apply.



# WatchGuard Network Security

## WatchGuard FIREBOX SOHO 6 WIRELESS

- 75Mbps firewall and 20Mbps VPN (3DES)
- Five 10/100 Fast Ethernet ports
- Remote management with Branch Office
- 3DES encryption, authentication, & IPsec VPN
- Anti-Virus and Content Filtering
- Includes 90-day LiveSecurity Service

Now, with a single appliance, you can protect both your wireless and wired networks. The WatchGuard® Firebox® SOHO 6 Wireless is an economical, high-performance, wireless Firewall, VPN and broadband-sharing appliance. Designed for small businesses requiring network security, the Firebox SOHO 6 Wireless eliminates wireless vulnerability, allowing employees and telecommuters to enjoy the independence of wireless.

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Delivery charges extra

**NEW  
Wireless  
Security**

Enjoy the convenience of wireless networking with the highest level of security

Firebox SOHO 6 Wireless backshot detail

### WatchGuard FireBox SOHO 6 Wireless

- 10 User Rent\* \$14.51/wk (J7935) **\$1,295**

### WatchGuard FireBox SOHO 6tc Wireless

- 10 User + VPN Rent\* \$17.65/wk (J7936) **\$1,575**

### WatchGuard FireBox SOHO 6tc Wireless

- 50 User + VPN Rent\* \$24.53/wk (J7937) **\$2,189**

### WatchGuard FireBox Vclass

ASIC based Firewall and VPN Appliances, featuring: VLAN, QOS and Server Load Balancing

## WatchGuard FIREBOX SOHO 6 & WatchGuard Firebox III

### Stand alone or Branch Office Firewall Appliances

- Excellent firewall and VPN performance at a great price.
- Dedicated security appliances that are easy to install and manage.
- Superior VPN support with IPSec branch office and remote user VPN functionality.
- Hardware expandability and new optional port for Branch Office VPN tunnel segregation and secure wireless access or dual ISP failover.

### Feature rich Firewall and VPN Appliances

- Great value richest security features in the SME market, including firewall protection proxies.
- Easy to deploy rapid installation with quick Setup Wizard and intuitive management interface.
- Simplified Administration Drag-and-Drop VPN creation, real-time monitoring, and traffic trend analysis.
- Certified technology ICSA compliant firewall and IPSec VPN technology.



WatchGuard® Firebox® Vclass brings high-speed ASIC-based network security to enterprise-class businesses, remote offices, service providers and data centers.

For more information Call Harris Technology

### FIREBOX SOHO 6



SOHO 6  
Rent\* \$10.07/wk

(G5584) **\$899**

### FIREBOX SOHO 6 TC



SOHO 6 tc 10 user  
Branch Office VPN with IPSEC  
Rent\* \$14.00/wk

(G5585) **\$1,249**

### FIREBOX SOHO 6 TC 50 User



SOHO 6 tc - 50 User  
+ Branch Office VPN  
Rent\* \$21.24/wk

(I0094) **\$1,895**

### FIREBOX III 500



WatchGuard Firebox III 500  
Rent\* \$35.00/wk

(J2169) **\$3,527**

### FIREBOX III 700



WatchGuard Firebox III 700  
Rent\* \$44.23/wk

(D3866) **\$4,675**

### FIREBOX III 1000



WatchGuard Firebox III 1000  
Rent\* \$72.09/wk

(D3789) **\$8,099**

### RENTSMART

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## Enhance Your Notebook

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### USB Flash Storage Drives

- Pocket Size
- True Plug and Play
- Security Zone Feature



**UFD-0032**  
32MB  
(G8721)  
**\$49**

**UFD-0064**  
64MB  
(G8722)  
**\$74**

**UFD-0128**  
128MB  
(G8723)  
**\$119**

**UFD-0256**  
256MB  
(G8724)  
**\$195**

**UFD-0512**  
512MB  
(G8725)  
**\$369**

**UFD-1000**  
1GB  
(J1849)  
**\$669**



**USB to PS/2 Adapter**  
**UKMC-100** USB to PS/2 Keyboard & Mouse Adapter  
(B0557) **\$47**



**USB Bluetooth Adapter**  
**BF-7211**  
USB to Bluetooth Adapter  
(H8797) **\$89**



**USB Flash Drives**  
Available from 32MB to 1Gig  
(see left side panel)



**USB 2.0 Hubs**  
USB 2.0 hubs are backward compatible with USB 1.1 products.

**UH-422** 4 Port USB 2.0 Pocket Hub  
(G8675) **\$88**

**UH-402** 4 Port USB 2.0 UFO Hub  
(G1938) **\$88**



### USB 2.0 Docking Station

Includes: 2 x USB 2.0 Ports,  
2 x PS/2 Ports, Printer Port,  
Serial Port & 10/100 Ethernet.

**UDS-102** USB 2.0 Docking Station  
(G8691) **\$199**



### USB Mini Hubs

**UH-201M** 2 Port USB 1.1 Mini Hub  
(G1939) **\$28**

**UH-401M** 4 Port USB 1.1 Mini Hub  
(G1940) **\$39**



### USB to Serial Converter

**UMC-100**  
USB to 9 Pin RS232 Serial Converter  
(80782) **\$69**



### Card Bus Adapters

**UCB-402** 4 Port USB 2.0 Cardbus  
(G4199) **\$95**

**1394-201** 2 port FireWire Cardbus  
(G8693) **\$69**



### USB Multi Card Readers

**BF-7352** USB 1.1 6-in-1 Card Reader  
(J2306) **\$46**

**BF-6261** USB 2.0 6-in-1 Card Reader  
(H8795) **\$78**



### USB 2.0 External HDD Enclosures

**UHD-2500** USB2.0 to 2.5" HDD  
(G8727) **\$89**

**UHD-3500** USB2.0 to 3.5" HDD  
(H8796) **\$120**



### USB Infrared Adapter

**UIR-100** USB to IrDA Wireless Adapter  
(D8944) **\$90**

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# Belkin - KVM Switches

Not all items are in stock at all stores but can be ordered for Pick-up or Delivery

Delivery charges extra

Belkin have a diverse product offering including networking and broadband sharing devices, award winning surge suppressors, wireless accessories, Firewire solutions, computer accessories, Audio/Video/Phone cabling an accessories and the largest selection of computer cables in the world. For more detailed product information and a look at our extensive range of connectivity solutions, come and visit our new look website at [www.belkin.com.au](http://www.belkin.com.au)!

## CONNECT MULTIPLE COMPUTERS USING BELKIN KVM SWITCHES

### Belkin PDA

#### Leather Cases



**F8P6401**  
For Palm Zire.  
(H0798)

**\$48**



**F8Y1405**  
For Sony Clie  
SL/SJ Series.

(H5024)

**\$48**

#### Charger



**F8Q2000**  
USB Sync  
Charger for  
iPAQ.  
Suits 3800/  
3900/5000  
Series.  
(E4744)

**\$39**

### F1DB102P



- Economy 2-Port KVM Switch**
- PS/2 Platform
  - Hot key switching and manual push-button port selection
  - Supports resolutions up to 2048x1536@85Hz

(D3162)

**\$92**

### B1DAU047



- SOHO Series 2-Port KVM Switch with Audio**
- USB Platform
  - Audio & microphone switching support
  - Supports resolutions up to 2048x1536@85Hz
- ★ Awarded Gold Award from IDEA & IDSA

(H0630)

**\$359**

### F1DA108Tz



- Admin 8-Port KVM Switch with OSD**
- Daisychainable
  - Hot key switching
  - PS/2 keyboard and mouse emulation
  - PS/2 in, PS/2 & USB out

Rent\* \$9.29/wk (E5377)

**\$829**

### F1DB104P



- Economy 4-Port KVM Switch**
- PS/2 Platform
  - 10 second auto-scan function
  - LED indicators

(D3159)

**\$179**

### F1DS104T



- SOHO Series 4-Port KVM Switch**
- PS/2 and USB Platforms
  - Audio and microphone switching support
  - Hot key switching and direct-port access button

(D3167)

**\$340**

### F1DA116Tz



- Admin 16-Port KVM Switch with OSD**
- Dedicated daisychain ports
  - BANK address displayed on front
  - PS/2 in, PS/2 & USB out
  - Comes with Belkin 5 year warranty

Rent\* \$12.31/wk (E5378)

**\$1,099**

## PROTECT AND INSURE YOUR VALUABLE EQUIPMENT FOR LIFE

### F5C208z2-TEL3



**SurgeMaster 8-way (2m cord) with Telephone Protection and \$80,000 Warranty**

- Lifetime, \$80,000 Connected Equipment Warranty
- Internet ready telephone/fax/modem protection
- Max Spike Amperage of 39,000 Amps
- BlockSpace™ to allow for large transformers
- EMI/Radio frequency interference filtering for clean power.

(C4607)

**\$125**

### F5C206z2-TEL3



**SurgeMaster 6-way (2m cord) with Telephone and Coaxial Protection and \$50,000 Warranty**

- Lifetime, \$50,000 Connected Equipment Warranty
- Protect your valuable Audio Visual Equipment
- 1184 joule energy rating for maximum protection
- 1.8 metre telephone cord and 1.8 metre coaxial cable included

(C4604)

**\$105**

### F5C195zTEL



**Single Outlet MasterCube with Telephone Protection and \$15,000 Warranty**

- Lifetime, \$15,000 Connected Equipment Warranty
- Max Spike Amperage of 27,000 Amps
- 824 joule energy rating for maximum protection
- Internet ready telephone/fax/modem protection
- Convenient and portable for travelling

(D5956)

**\$35**

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# Belkin Networking Solutions

## 54g NETWORKING FROM BELKIN - FAST AND EASY

Not all items are in stock at all stores but can be ordered for Pick-up or Delivery

Delivery charges extra

Move into high gear with speeds up to 54mbps, without wires! 54g technology provides you with networking speeds nearly five times faster than the current Wi-Fi (802.11b) standard. This brand new technology is backward compatible with the 802.11b Wi-Fi networking standard, so it allows you to implement faster wireless technologies in combination with existing 802.11b Wi-Fi networks. An added Turbo Mode will isolate your network from 802.11b wireless clients and allow your network to transmit data at the highest 54g data rate. Belkin's 54g products are also fully upgradeable when 802.11g is ratified. Now more than ever there is no reason to delay, get wireless today.

### F5D7230au - 54g Wireless DSL/Cable Gateway Router

### F5D7130au - 54g Wireless AccessPoint



- Compatible with all 802.11b devices
- Network security with 128-bit WEP encryption
- Works with MAC or PC computers

(J2207) **\$299**



- Extends your 802.11b or 54g wireless network
- 3 times the operating range of 802.11a
- Adds wirelessly networked PCs to your wired network

(H2200) **\$279**

All come with Belkin Lifetime Warranty

### F5D7000au - 54g Wireless Desktop Network Card

### F5D7010au - 54g Wireless Notebook Network Card



- Fits any standard 32-bit PCI expansion
- Interoperable with all 802.11b 2.4GHz devices • 3 times the operating range of 802.11a

(H2197) **\$149**



- Fits any standard 32-bit Cardbus slot
- Low power consumption chipset
- Use Turbo mode for speeds of up to 54mbps

(H2196) **\$149**

## QUICK AND SMART - USB SOLUTIONS FROM BELKIN



### F5U228

#### Hi Speed USB 2.0 DVD Creator

- Capture video from analog sources to digital • Includes "Ulead" movie editing and DVD software.

(H0616) **\$169**



### F5U248

#### USB 2.0 8-in-1 Media Reader/Writer

- Works with CFII, SM, SD, MMC, MD, MS and MGS

(J2210) **\$99**



### F5U230

#### USB to Infrared Smartbeam

- Transfer files easily from your PDA, mobile or notebook

(H0927) **\$97**

### F5U900au

#### USB 2.0 Computer Upgrade Kit

- Achieve speeds of up to 480mbps

(F0897) **\$99**

## Belkin PDA

### Hard Flip Case



### F8Q1410

For HP IPAQ 3700/3900 with easy-access stylus holder

(H2222)

**\$59**

### Penlight Stylus



### For HP IPAQ 3800/3900/5000 series

(G7751)

**\$23**

For Palm, Handspring, Sony, Jornada

(G7752)

**\$23**

### Accessories Kit

### F8E924

For HP IPAQ 1910 series

(J4674)

**\$99**

## "ON THE GO"? CHECK OUT SOME OF OUR MOBILE ACCESSORIES

### F8E825-USB - Mini-Wireless Optical Mouse (USB)



- The popular optical mini-mouse is wireless!
- Small and compact for travellers
- Engineered with the latest optical technology
- 27MHz for worldwide compatibility

(H5027) **\$79**

### F8E466-MOB - Numeric Keypad



- Works instantly with USB plug&play technology
- Slim, lightweight design
- Suits any notebook that is USB ready
- Comes with Belkin Lifetime Warranty

(J2212) **\$29**

### F8E448 - Retractable USB Light



- White LED lamp provides illumination in any setting
- Notebook clip positions light where you need it
- Swivel directional head
- Retractable 19" cable

(J0895) **\$29**

### F5U217auMOB - 3-Port Hi-Speed USB 2.0 Pocket Hub



- 3 USB 2.0 or USB 1.1 ports
- Extremely lightweight, perfect for travel
- Switching power supply-for worldwide use

(J2213) **\$99**

### F8T003

#### Bluetooth USB Adaptor

- 10 metre range • Works with any device equipped with Bluetooth 1.1 • Built-in security with 128-bit encryption



(H0619) **\$89**

### F8T001

#### Bluetooth USB Adaptor

- 100 metre range • Includes convenient 5ft. USB extension cable • Plug & Play set-up & use



(G7765) **\$145**

### F8T002

#### Bluetooth PCMCIA Card

- Allows distances up to 10metres • Connects to your PC to eliminate the necessity of cables • Travels well for a convenient mobile solution



(G7766) **\$245**

### F8T0202

#### Bluetooth PDA Card

- Low-power consumption to keep your PDA running longer • Upgrade your PDA to Bluetoothconnectivity • Supports Microsoft Pocket PC 2000 & 2002



(G7767) **\$245**

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**SAMSUNG**

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# High-Breed Monitors

Not all items are in stock at all stores but can be ordered for Pick-up or Delivery

Delivery charges extra

**DON'T FORGET your Fly Buys points!**

## SyncMaster 753DFX - 17" Flat CRT Monitor



- 17" (16" Viewable)
- 0.20mm dot pitch (horizontal)
- 1280 x 1024 @ 65Hz Maximum Resolution
- DynaFlat - Infinitely Flat Tube
- Smart III surface treatment (anti-static & anti-glare)
- On Screen Digital Display
- Plug & Play Compatibility
- MPR-II/NUTEK certified

(C1283)

**\$224**

## SyncMaster 172W - 17" LCD Monitor

**Widescreen**

- Viewable Image Size: 17"
- 1280 x 768 Max Resolution
- Contrast Ratio: 400:1
- Viewing Angle (H/V): 140/110 (degrees)
- Interface: Analog/Digital
- Horiz. Frequency: 30-81 (kHz)
- Brightness (Typical): 450 cd/m2
- Special Features: Wide format, new slim design, retractable base, wall mount included
- 3 year warranty

Rent\* \$13.30/wk

(G9866)

**\$1,187**

## SyncMaster TM 213T - 21" LCD Monitor



- Viewable Image Size: 21.3"
- Brightness (Typical): 250 cd/m2
- Contrast Ratio: 500:1
- Viewing Angle (H/V): 170/170 (degrees)
- Interface: Analog/Digital
- Horiz. Frequency: 30-93 (kHz)
- Max/Native Resolution: 1600x1200
- Emissions Standard: TCO '99
- Available Color(s): Silver
- Special Features: Narrow Bezel Design, Pivot Technology/Swivel

Rent\* \$29.76/wk

(J2605)

**\$2,999**

## SyncMaster 173V - 17" LCD Monitor



- Viewable Image Size: 17"
- Brightness (Typical): 250 cd/m2
- Contrast Ratio: 350:1
- Viewing Angle (H/V): 140/120 (degrees)
- Interface: Analog
- Horiz. Frequency: 30-81
- Max/Native Resolution: 1280 x 1024
- Emissions Standard: TCO '99
- Color(s): Silver, Ivory
- Special Features: Built-in Power Supply

Rent\* \$8.95/wk Silver

(J2616)

**\$799**

Rent\* \$8.95/wk Ivory

(J2615)

**\$799**

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## Cameras, Projectors, Display & Storage

### DIGITAL STILL CAMERAS



### Cyber-shot

Not all items are in stock at all stores but can be ordered for Pick-up or Delivery

Delivery charges extra

#### DSCP32



- 3.2 Megapixel
- Digital Smart Zoom
- 1.6" Colour LCD
- MPEG Movie VX

(H1620) **\$495**

#### DSCP72



- 3.2 Megapixel
- 3x Optical Zoom
- Digital Smart Zoom
- 1.6" Colour LCD
- MPEG Movie VX

Rent\* \$7.79/wk  
(H1622) **\$695**

#### DSCP85



- 3.2 Megapixel
- 3x Optical Zoom
- Digital Smart Zoom
- 1.5" Colour LCD
- MPEG Movie VX
- Histogram indicator

Rent\* \$9.51/wk  
(H9498) **\$849**

#### DSCP92



- 5.0 Megapixel
- 3x Optical Zoom
- Digital Smart Zoom
- 1.5" Colour LCD
- MPEG Movie VX
- AF illuminator

Rent\* \$9.85/wk  
(J4493) **\$875**

#### DSCP105



- 5.0 Megapixel
- 3x Optical Zoom
- Digital Smart Zoom
- 1.5" Colour LCD
- MPEG Movie VX
- Histogram indicator
- Built-in Mic & Speaker

Rent\* \$13.39/wk  
(I0020) **\$1,195**

All cameras supplied with battery, charger, software, USB cable and memory stick.

### Memory Stick Digital Photo Printer



Edit and Effect modes  
Dye Sub Printing  
Direct print out from Memory Stick  
Display images on a PC and a TV

(G9641) **\$489**

**SVM25LS**  
25 sheet print paper including ink cartridge



(E1491) **\$25**

**SVM75LS**  
75 sheet print paper including ink cartridge



(K0690) **\$67**

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### MICROVAULT



### MINI MICROVAULT

USM32U2 (G8386) **\$69**

USM64U2 (G8388) **\$99**

USM128U2 (G8390) **\$149**

USM256U2 (G8394) **\$269**



- USB2.0 Storage Device
- Compatible with USB1.1
- Plug 'n' Play
- Software bundle includes: Password Lock, AutoZip, Auto Login, PC Lock
- Mini Micro Vault supplied with a docking station for easy access



USM32S (J4481) **\$99**

USM64S (J4482) **\$129**

USM128S (J4483) **\$199**

USM256S (J4484) **\$319**

Images for illustration purposes only

### LCD H - SERIES



SDMH553

Sleek, lightweight and flexible design with zero footprint. Features include - bright picture, sharp images and wide viewing angles.

#### SDMH553

15" XGA Display  
Rent\* \$7.68/wk  
(J4477) **\$686**

#### SDMH573

17" SXGA Display  
Rent\* \$11.87/wk  
(J4478) **\$1,059**

#### SDMH593

19" SXGA Display  
Rent\* \$19.86/wk  
(J4480) **\$1,772**

### ULTRA PORTABLE PROJECTORS

#### VPLCS6

- SVGA Display
- 1800 ANSI Lumens
- Ceiling Mountable
- Auto Keystone Correction
- Security Password Protection
- Remote Commander
- Wireless Mouse
- USB

Rent\* \$36.48/wk (K0077) **\$3,676**

#### VPLCX6

- XGA Display
- 2000 ANSI Lumens
- Memory Stick compatible
- Ceiling Mountable
- Auto Keystone Correction
- Security Password Protection
- Remote Commander
- Wireless Mouse

Rent\* \$51.33/wk (K0078) **\$5,563**

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# Imation™ Optical & Tape Storage

Not all items are in stock at all stores but can be ordered for Pick-up or Delivery

Delivery charges extra



## Professional Grade CD-Recordable

This top-tier CD-R media provides the ultimate in optical storage. Designed for professionals and consumers who demand nothing but the best, Imation Professional Grade CD-Rs are high-durability, write-once media designed to provide high-quality data storage and superior audio recording. These premium discs feature a scratch-resistant surface and an enhanced dye layer with built-in UV degradation for maximum data reliability and longevity. Imation Professional Grade CD-Rs are capable of record speeds up to 48x.

CD-R Professional Grade Gold 5 Pack Regular Case (J6996)

**\$6**

## CD-Recordable

CD-R 48x 700MB/80Min 10 Pack Slim Line Jewel Case

(J6104) **\$9**



## DVD Media

DVD+R 4.7GB 2.4x Single

(G9267) **\$7**

DVD-R 4.7GB Single

(J6015) **\$6**



## CD-Recordable

CD-R 48x 700MB/80Min 25 Pack Spindle Imation Branded

(J6106) **\$15**



## DVD Rewritable Media

DVD+RW 4.7GB Single

(J6024) **\$10**

DVD-RW 4.7GB Single

(G9269) **\$9**



**Black Watch™**  
Black Watch DLTape IV  
Compatible with DLT 4000, DLT 7000 and DLT 8000 Drives (98425)  
**\$99**

**Black Watch™**  
Super DLTape  
Compatible in both SDLT 220 and 320 Drives (G9333)  
**\$207**



**AIT3 Data Tape**  
100GB/  
260GB  
(G9308)

**\$177**

**AIT2 Data Tape**  
50GB/  
100GB  
(G9309)  
**\$140**

## CD-Rewritable

CD-RW 4x 650MB/74Min 10 Pack Slim Line Jewel Case

(G2250) **\$16**



## CD-Rewritable Mini

CD-RW 4x Mini 80mm/8cm 185MB/21Min 10 Pack

(J6083) **\$20**

## Travan™ Cartridges

Travan 40GB 20GB/40GB

(J6181) **\$93**

Travan NS20 10GB/20GB

(70723) **\$75**



## 4mm Data Certified Tape Cartridges(DDS4)

DDS 150 (DDS-4) (E0439)

**\$32**

DDS 125 (DDS-3) (E0432)

**\$18**

DDS 120 (DDS-2) (E0428)

**\$12**



## Black Watch™ LTO/Ultrium Tape Cartridges

- Black Watch Ultrium 2 Tape Cartridges offer up to 400GB capacity with up to 80MB/second transfer rate while Ultrium 1 Tape Cartridges offer up to 200GB capacity and up to 40MB/sec. Transfer rate (assumes 2:1 compression) • Protective cartridge strength - Patented corner-snap helps to keep the leader pin in place and the cartridge closed if dropped, protecting your valuable data from error-causing debris • Improved tape handling - Patented three-piece tape spool design protects the tape edge by keeping it flat, protecting your data across the entire width of the tape • Precise data reading/writing capability from the original servo experts means you can depend on your data from years to come • Universal Cleaning Cartridge available.

Black Watch Ultrium (LTO) Tape Cartridge (100GB/200GB) with Case

(J7001) **\$127**

Black Watch Ultrium (LTO) Tape Cartridge Gen 2 (200GB/400GB) with Case

(J7002) **\$282**



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# LOGITECH

HT Web Direct

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## Cordless and Optical Combinations

### QuickCam® for Notebooks Pro

Logitech® QuickCam® for Notebooks Pro lets you stay in touch when you're travelling. This ultra-portable, compact and stylish web camera is equipped with a high-quality VGA CCD sensor and includes an integrated mount and built-in microphone. Bring your instant messages to life by adding live video, e-mail photos and videos and make video calls.

**2 year warranty**



(G2810) **\$219**

### QuickCam® for Notebooks

This portable and compact webcam is designed for PC notebook users. Its integrated universal notebook mount folds up to protect the lens when not in use. Use QuickCam® for Notebooks to add video to your instant messages or to capture stills and videos and send them in an e-mail. USB connection.

**2 year warranty**



(F3093) **\$109**

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**Delivery charges extra**

Logitech® Marble Mouse



Fits right or left hand like a mouse and works like a trackball, saving space while reducing hand and wrist movement.

3-year warranty. (B7946)

**\$48**

Premium Stereo Headset



(H8682)

**\$40**

QuickCam Express



(D5894)

**\$85**

Access Keyboard



(F7292)

**\$38**

Optical Mouse optical!



(B9948)

**\$45**

### MouseMan Traveler

Logitech's stylish, compact mouse is specifically designed for notebook use.

The high-performance optical sensor offers smoother scrolling and greater accuracy. MouseMan Traveler's innovative design fits comfortably in either hand. Includes a protective carrying case.

**5 year warranty**



(D4014) **\$55**

### MX-310 Optical Mouse

Step up to advanced precision with the MX-310 Optical Mouse. The Logitech®MX Optical Engine responds instantly to even your fastest movements with more accuracy and control. Leading-edge design offers comfort for either hand. Touch a button to switch between active programs. Internet forward and back buttons speed surfing.

**5 year warranty**



(K0504) **\$67**

### Logitech® Navigator Trio

Logitech® Navigator Trio is the complete communication solution for your PC. The comfortable ultra-flat cordless keyboard features enhanced Function keys to simplify the things you do most often. The cordless optical mouse provides greater accuracy on almost any surface. The included Logitech QuickCam Messenger is an easy-to-use webcam with a built-in microphone. E-mail videos and photos or video-chat online.

**2 year warranty**



(G9642) **\$197**

### Logitech® X-120 Stereo Speakers

Logitech's X-120 stereo speakers have the sound and features you expect from Logitech®. User friendly controls and improved acoustic design provide an enhanced audio experience. Distinctively designed and acoustically engineered satellites use a bass port to provide a full, rich sound.

**2 year warranty**



(K0505) **\$68**

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## CD and DVD Media: Storage for Life

Not all items are in stock at all stores but can be ordered for Pick-up or Delivery

Delivery charges extra



DataLife Colours CD-R 80 min Slim Case 10 pk 48x (G2015) **\$11**



DataLife Colours CD-R 80 min Slim Case 25 pk 48x (G2890) **\$25**



DataLife CD-R 80 min Slim Case 10 pk 48x (G4639) **\$9**



DataLife CD-R 80 min 25 pk Spindle 48x (G6034) **\$18**

### DataLifePlus CD-R



• 80 min 1x - 48x 10 pack (G1680) **\$10**

• 80 min 1x - 52x 10 pack slim case (H9519) **\$11**

### DataLifePlus Spindles

• Inkjet printable 80 min 48x spindle of 50 (G1742) **\$35**



• Silver thermal printable 80 min 48x spindle of 50 (H1073) **\$36**

• 80 min DataLifePlus spindle 30 pack 48x (G5999) **\$22**

• 80 min DataLifePlus spindle 50 pack 52x (H9517) **\$36**

### DataLifePlus DVD-R



• 4.7GB DVD-R 4x singles jewel case (H1479) **\$7**

• DVD-R 2x inkjet printable 20 pack spindle (F7683) **\$114**

### DataLifePlus DVD+R



• 4.7GB DVD+R 4x singles jewel case (H1255) **\$7**

• 4.7GB DVD+R 2.4x inkjet printable 20 pack spindle (H0608) **\$114**

### Digital Vinyl CD-R

Designed to look like a vinyl record these eye-catching discs are a great way to save delicate LP collections or make a standout business presentation.



Inkjet Printable version now also available

• CD-R: 80 min vinyl 10 pack (G1731) **\$11**  
• Spindle of 50 Printable (J9660) **\$45**

### DataLifePlus CD-RW

• 700MB CD rewritable 2x - 4x 5 pack colours (D9230) **\$7**



• 650MB 2x - 4x singles (77492) **\$2**

• 650MB 16x - 24x ultra speed singles (G1741) **\$2**

• 650MB 4x - 12x high speed 5 pack (G6434) **\$8**

### DataLifePlus DVD-RW



• 4.7GB DVD-RW 2x singles jewel case (J9591) **\$8**

### DataLifePlus DVD+RW



• 4.7GB DVD+RW 2.4x singles jewel case (D9166) **\$9**

Verbatim DataLifePlus CD's represent the latest in technology. Featuring a proprietary blue Super-Azo dye which has the best resistance to sunlight, silver reflective layer for optimum read and write performance and multispeed recording.

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## Newly Announced Products

### Adaptec VideoOh! DVD Media Center USB

VideoOh!™ DVD Media Center is an all-in-one solution for watching, controlling and recording TV on your PC. The solution easily converts analogue and digital media into MPEG files. As a personal video recorder (PVR), Media Center can record TV shows, time-shift and burn to DVD or video CD.



USB version (K1108) **\$399**

PCI version also available (K1112) **\$349**

### Adaptec VideoOh! DVD

Adaptec® Video Converter DVD USB-Device Kit (VideoOh!™ DVD) provides the easy way to convert analog camcorder movies digitally then create easy-to-share, long-lasting DVD or Video CD discs with your home computer. VideoOh! DVD includes an external USB 2.0 MPEG-2 capture/encoder box with USB & A/V cables for simple connectivity to camcorders or other analog video device. It also includes Sonic™ MyDVD™ DVD-Video creation software for Windows®, which allows you to edit, organize and burn video clips.

USB version (K1118) **\$449**

PCI version also available (K1466) **\$399**

### Adaptec VideoOh! CD kit

Adaptec® Video Converter CD USB-Device Kit (VideoOh!™ CD) provides the easy way to convert analogue camcorder movies digitally then create easy-to-share CD or Video CD discs with your home computer. It includes a USB 1.1 video capture device with USB & A/V cables and Sonic™ MyDVD™ Video creation software for Windows.



(K1274) **\$169**

### Adaptec DuoConnect FireWire Combo kit

DuoConnect is a combination USB 2.0 and FireWire card for PCs and Macs. It has four USB ports (3 ext, 1 int), three FireWire ports (2 ext, 1 int), includes a FireWire 6-4 pin cable, Sonic MyDVD 3, MGI VideoWave 4SE, and Windows 98SE, Me and 2000 USB 2.0 drivers.



(D3340) **\$199**

### Adaptec DuoConnect for Notebooks Kit

Why buy two cards when you can get all the high-speed connectivity you need using one Adaptec DuoConnect card for Notebooks? With FireWire and USB 2.0 connections in a single card, you save money and only need to carry one card when you travel. Includes USB 2.0 Windows drivers.



(J8783) **\$249**

### Adaptec Xhub7+ Kit

Adaptec® Xhub7+ is a 7-port USB 2.0 hub featuring fully-powered ports, stackability, and advanced industrial design. The XHub is USB 2.0 Hi-Speed Certified, USB 1.1 backward compatible, and provides easy plug-and-play expansion. Included stand provides cable management. Includes Adaptec USB 2.0 drivers, Adaptec USBControl Utility, cable, and customizable picture-insert frame.



(D3339) **\$199**

Not all items are in stock at all stores but can be ordered for Pick-up or Delivery

Delivery charges extra

Adaptec  
Serial ATA  
RAID  
1210SA  
Kit



(K1129)

**\$159**

Adaptec  
29160 PCI  
SCSI  
Adapter Kit



(91098)

**\$549**

Adaptec  
SCSI CARD  
29320-R  
Kit



(K1130)

**\$725**

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# Next Generation Backup Solutions

Not all items are in stock at all stores but can be ordered for Pick-up or Delivery

Delivery charges extra

## MEDIA

**DLT Tape Media IIIXT 15/30GB Tape**

(68362)

**\$79**

**DLT Tape IV Media 20/80GB**

(71231)

**\$125**

**DLT Cleaning Tapes**

(97851)

**\$83**

**Super DLT Media 110/320 GB**

(B9825)

**\$233**

**LTO Ultrium 100/200 GB Tape**

(D1500)

**\$128**

**1 SuperDLT Cleaning Tape**

(E4874)

**\$214**

**LTO 2 Tape (J5881)**

**\$285**

## LoaderXpress

- DLT1, DLT8000, SuperDLT - up to 1.1TB, 10 Cartridges
- LTO 1 & 2 Ultrium - up to 4.4TB, 11 Cartridges.

The LoaderXpress is a family of autoloaders which combine the latest drive technology with field-proven and award winning robotics first introduced by Overland. This line is an excellent entry point for users who require tape automation on a modest budget. LoaderXpress products support the LATEST in tape technology.

**LXLS810ST** Single DLT8000 Drive

Rent\* \$83.68/wk (F3150) **\$9,980**

**LXL1S10T** Single SuperDLT 220 BRC Drive

Rent\* \$148.63/wk (B6370) **\$18,475**

**LXL1U11T** Single LTO Ultrium Drive

Rent\* \$144.77/wk (E6376) **\$17,995**

**LXL2U11T** Single LTO 2 Tape Drive

Rent\* \$186.45/wk (J5823) **\$23,175**

## AIT PowerLoader

- AIT-2, AIT-3 drives - 950GB, 1900GB, 19 Cartridges plus mail slot
- 1 or 2 drives - field-upgradeable, bar code reader standard.



**Neo Series 2000 System**

Up to 96TB native

Up to 16 drives

Up to 240 cartridges

**LP2L119TB** Single AIT-2 Tape Drive

Rent\* \$121.51/wk (F3177) **\$14,990**

**LP3L119TB** Single AIT-3 Tape Drive

Rent\* \$157.44/wk (F3179) **\$19,569**

## PowerLoader

- DLT1, DLT8000, SuperDLT-up to 1.7TB, 15 or 17 Cartridges
- 1-2 drives, field-upgradeable, barcode reader standard.
- **Now Available: LTO 1 and LTO 2**

Overland PowerLoaders offer a step up in capacity and performance at a minimal cost for users who may currently use a standalone tape drive or small autoloader and now need more performance. Overland offers a series of autoloaders that can be field upgraded to two drives. The PowerLoader offers the most popular drive technologies ensuring that existing tape media archives can be read.

**LXM1L117TB** Single LTO Tape Drive 17 tape capacity

Rent\* \$172.17/wk (H0638) **\$21,400**

**LXM8115TB** Single DLT8000 Tape Drive 15 tape capacity

Rent\* \$111.58/wk (F3171) **\$13,765**

**LXM2S115TB** Single SuperDLT 320 BRC Drive 15 tape capacity

Rent\* \$166.74/wk (H9768) **\$20,725**

**LXM2L117TB** Single LTO-2 Tape drives 17 tape capacity

Rent\* \$188.95/wk (J4736) **\$23,486**

## Neo Series 2000

- DLT8000, SuperDLT, LTO Ultrium - up to 6TB
- 1 or 2 drives - field-upgradeable
- 26 (DLT8000, SDLT) or 30 (LTO) cartridges.

The Neo series is the newest library family from Overland and it provides unprecedented levels of availability through Non-Stop Operation, investment protection through SmartScale Architecture, and flexible connectivity to direct attach or SAN environments through Virtual Interface Architecture.



**LXN2130R2UL** Single LTO-2 Tape Drive

Rent\* \$241.27/wk (H9769) **\$29,989**

**LXN2126T1SL** Single SDLT220 Tape Drive

Rent\* \$231.70/wk (F3182) **\$28,799**

**LXN2126T2SL** Single SDLT320 Tape Drive

(F4315) **\$30,695**

**LXN2130T1UL** Single LTO-1 Ultrium Tape Drive

Rent\* \$233.11/wk (F3185) **\$28,975**

\* The figures quoted are based on a per week basis over 3 years. T.A.P. Terms and Conditions apply.

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# SONY®

HT Web Direct

[www.ht.com.au/cat/sony](http://www.ht.com.au/cat/sony)

## Sony Tape Storage Solution

### StorStation - AIT IDE & USB / i.LINK Tape Backup Kits



Internal AIT drive with ATAPI IDE (Ultra DMA) interface. Media life of approx 30,000 record/read cycles. Kits include: 1 cleaning tape, Retrospect software tape for desktop or server, cables and mounting screws.

Internal: SDX420B  
Up to 90GB

Internal: SDX520B  
Up to 130GB

AIT-1 Rent\* \$17.58/wk  
(F9899) **\$1,569**

AIT-2 Rent\* \$29.72/wk  
(10026) **\$2,995**



External AIT drive with USB2.0/ i.LINK Interface. Media life of approx 30,000 record/read cycles. Kits include: 3 Tapes, 1 cleaning tape, Retrospect software for desktop or server, USB & 2 i.LINK cables.

External: AITE90UL  
Up to 90 GB

AIT-1 Rent\* \$23.03/wk  
(H9667) **\$2,055**

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Delivery charges extra

### SONY AIT Media

**SDX125C**

25-50GB AIT-1  
Tape Media with

MIC  
(64336)

**\$110**

**SDX135C**

35-90GB AIT-1  
Tape Media with

MIC  
(B2626)

**\$115**

**SDX250C**

50-130GB AIT-2  
Tape Media with

MIC  
(80637)

**\$130**

**SDX3100C**

100-260GB  
Single AIT-3

Data Cartridge  
(D6119)

**\$149**

### DDS Media

**DGD120P**

4mm DDS-2  
120M (4/8GB)

DAT Tape  
(13262)

**\$12**

**DGD125P**

4mm DDS-3  
125M (12/24GB)

DAT Tape  
(66576)

**\$19**

**DGD150P**

4mm DDS-4  
150M (20/40GB)

DAT Tape  
(88711)

**\$45**

### StorStation - AIT Internal or External SCSI Tape Backup Kits



SDX400B 35-90GB AIT 1 Internal Backup kit - Rent\* \$23.77/wk (C7480) **\$2,395**

SDXD400B 35-90GB AIT1 External Backup kit - Rent\* \$26.59/wk (C7478) **\$2,680**

SDX500B 50-130GB AIT2 Internal Backup kit - Rent\* \$34.68/wk (E1026) **\$3,495**

SDXD500B 50-130GB AIT2 External Backup kit - Rent\* \$37.79/wk (E1027) **\$3,995**

SDX700BKIT 100-260GB AIT3 Internal Backup kit - Rent\* \$66.71/wk (E1029) **\$7,495**

SDXD700BKIT 100-260GB AIT3 External Backup kit - Rent\* \$71.16/wk (G2855) **\$7,995**

AIT 3 kits include  
10 x AIT3 100-260GB  
tapes bundled  
free of charge

### StorStation - AIT Auto Loaders - So much storage, so little space



- Single AIT drive, 8 tape capacity
- Available in AIT-1, AIT-2 & AIT-3 format
- Large Capacity: up to 2TB (AIT-3 compressed)
- Small Size: designed to fit on a desktop
- Fast Backup: Up to 112GB/h (AIT-3 compressed)
- Easy Management from the front panel
- All autoloaders include SCSI terminator & cable, 8 tapes media and cleaning cartridge

**LIBD81A1**

Rent\* \$70.27/wk  
(10028) **\$7,895**

**LIBD81A2**

Rent\* \$83.76/wk  
(10029) **\$9,989**

**LIBD81A3**

Rent\* \$97.19/wk  
(10030) **\$11,990**

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## Smart Storage Solutions

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Delivery charges extra

### Zip 750MB Drive

More speed and more capacity, this NEW 750MB drive and disk is the fastest and most durable, portable storage solution to back up your important data.

Iomega Automatic Backup software makes backup a snap and Iomega Sync software helps transfer files between computers. Zip 750MB drives and disks are the smart data storage choice.



USB 2.0

(F9601) **\$370**

Firewire

(G2978) **\$397**

### Host Powered 250MB USB

NEW - Host-powered Zip® 250MB USB drive.

Now it's even easier to take your information with you. The Zip® 250 USB drive is now available with a USB cable that provides both data and power, so you don't need any external power source. It's easy to connect (just plug it in) and easy to launch (no rebooting)! This new drive is compatible with most major operating systems and all Zip® 100MB and 250MB Zip® disks.



(J7553) **\$233**

### External Hard Disk Drive

Iomega External Hard Drive adds secure storage easily and quickly. It comes complete with Iomega Sync™ and Automatic BackUp™ disaster recovery software to protect your files.



NOW with Norton Ghost

USB 2.0 80GB

(F9625) **\$380**

USB 2.0 120GB

(J2793) **\$520**

### Portable Hard Disk Drive

Iomega portable hard drive is a complete solution that keeps security, recovery and data storage easy.

QuickSync™ automatic back-up and disaster recovery software protects your files. Built in a durable, slim design that's easy to take with you.



NOW with Norton Ghost

(USB 2 Card sold separately)

USB 2.0 20GB (G4671) **\$330**

USB 2.0 40GB (F9794) **\$549**

### Iomega Mini Drive

Iomega USB mini-Drives weigh only 20g can be carried with your keys or in your pocket. Comes with 3 year warranty, 32 bit processor for greater speed and versatility, Iomega's unique security and software.

### 128MB



(G9836)

**\$145**

### 256MB



(H9652)

**\$249**

Images for illustration purposes only

### NAS Servers

Non Hot Swapable Drive

A205m 160GB Intel Cel 1.7, 128MB RAM, USB 2.0 Rent\* \$23.42/wk (J4653)

A305m 240GB Intel Cel 2.0, 256MB RAM, USB 2.0 Rent\* \$31.89/wk (J4651)

Hot swapable drive/fan/power supply

P435m 320GB Intel P4 1.8GHz CPU, 512MB RAM Rent\* \$64.08/wk (J4601)

P440m 480GB Intel P4 2.0GHz CPU, 1GB RAM Rent\* \$75.30/wk (J3572)

P445m 720GB Intel P4 2.0GHz CPU, 1GB RAM Rent\* \$90.78/wk (J3481)

P800m 960GB 2 Intel Xeon 2.4GHz CPU, 1GB RAM Rent\* \$172.54/wk (J3262)

P850m 1.44TB 2 Intel Xeon 2.4GHz CPU, 2GB RAM (J4650)

**\$2,090**  
**\$3,214**



NOW with USB 2.0 Connectivity

**\$7,199**  
**\$8,460**  
**\$11,199**  
**\$21,446**  
**\$call**



### CD-RW 52x24x52 USB 2.0

For the fastest and easiest way to save and share music, photos and more, choose an Iomega® CD-RW drive. With up to

52x24x52 write/rewrite/read speeds you can burn a 60-minute CD in less than 3 minutes. Includes plug-and-play functionality for portability, buffer under-run protection for reliability and Iomega HotBurn® Pro software with advanced functionality easy CD customization, burning MP3s and organizing digital photos. (USB 2 Card sold separately)



(J0752) **\$279**

### DVD Dual Drive

Iomega introduces its multi-format DVD/CD-RW drive you can read and record in nearly any standard format. Everything you need is here for creating, editing, and sharing video, music, photos and more!

- DVD+RW 4x Record, 2.4x ReWrite, 12x Read
- DVD-RW 4x Record, 2x Rewrite, 12x Read
- CD-RW 16x Record, 10x ReWrite, 40x Read

Don't be caught short!



(J4558) **\$489**

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## New External Hard Drives

### Your Best Ideas Need Maxtor OneTouch™



- Easy** - Just push the button to make a backup copy of your files.
- Fast** - Back up files faster than floppy, CD or removable cartridge systems.
- Convenient** - Make backup copies of your files, while you work, with a simple push of a button.
- Flexible** - Use Maxtor OneTouch™ or run automated, unattended backups with Dantz Retrospect® Express.

Not all items are in stock at all stores but can be ordered for Pick-up or Delivery

Delivery charges extra

### Quick and Easy Installation

- 1 Install the software
- 2 Plug in the drive
- 3 Push the button and follow on-screen directions

#### PERSONAL STORAGE

## 5000LE

Ideal for home or office, the Maxtor Personal Storage™ 5000LE external hard drive quickly adds storage and organisational space through your computer's USB port.



Perfect for home or office  
Exclusive Maxtor OneTouch™ **80GB**

80GB

(G4110) **\$349**

- Easy add-on storage for home or office
- Perfect for photos, music and documents
- Maxtor OneTouch™: the easy way to make backup copies of your files
- Dantz® Retrospect® Express software included
- USB 2.0/1.1 compatible
- Up to 480MB/sec data transfer rate
- Quick and easy installation
- Maxtor award-winning hard drive technology
- Stands vertically or horizontally

#### PERSONAL STORAGE

## 5000DV

The Maxtor 7200RPM hard drive featuring both FireWire (IEEE1394, i.LINK®) and USB 2.0 interface ports gives you one of the most versatile drives available for your PC.



Perfect for video editing and high-end graphics

Exclusive Maxtor OneTouch™ **160/200GB**

160GB

200GB

(H0596) **\$499**

Rent\* \$6.71/wk (H0553) **\$599**

- Versatile add-on storage for editing videos and high-end graphic files
- Maxtor OneTouch™: the easy way to make backup copies of your files
- Dantz® Retrospect® Express software
- Quick and easy installation
- Flexible dual interfaces—FireWire® and USB 2.0/1.1 compatible
- Powerful performance—7200RPM

#### PERSONAL STORAGE

## 5000XT

Flexible add-on storage for your home or office, with room to grow. With 250GB, the Maxtor external hard drive provides you with enough capacity to hold and organize your storage-hungry applications and files.



Perfect for storage-hungry files

Exclusive Maxtor OneTouch™ **250GB**

250GB

Rent\* \$7.27/wk (G4113) **\$649**

- Flexible add-on storage for storage-hungry files
- Maxtor OneTouch™: the easy way to make backup copies of your files
- Dantz® Retrospect® Express software included
- Quick and easy installation
- Flexible dual interfaces—FireWire® and USB 2.0/1.1 compatible
- Rotational Speed 5400RPM
- Stands vertically or horizontally
- Hot-swappable

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# Pioneer

HT Web Direct

[www.ht.com.au/cat/pioneer](http://www.ht.com.au/cat/pioneer)

## Multimedia: DVD-ROM & DVD Writer

Not all items are in stock at all stores but can be ordered for Pick-up or Delivery

Delivery charges extra

IT & T AWARDS  
RESELLER  
OF THE YEAR  
2002

Collect Fly Buys points on your computer hardware & software when you purchase from

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TECHNOLOGY

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HARRIS  
TECHNOLOGY

### DVR-A06 Internal DVD-R/RW/+R/+RW/CD-R/RW Recorder

Pioneer's new sixth generation **DVR-A06** drive now includes high speed writing to both DVD-R/RW and DVD+R/RW formats as well as improvements to writing accuracy and playback compatibility of recorded media. The latest versions of award-winning Ulead software including DVD Workshop SE with Dolby AC-3 audio encoder are also included.

**INCLUDES COMPREHENSIVE SOFTWARE BUNDLE**

ULEAD  
CREATIVE INTELLIGENCE

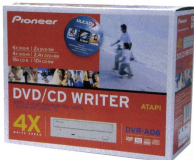
AC-3

nero5  
BURNING ROM

- Ulead DVD Workshop SE with Dolby in AC-3 stereo audio encoder
- Ulead Video Studio 7.0 SE Interactive Tutorial
- Ulead Studio Suite: Video Studio 7.0 SE, DVD Movie Factory SE 2.0 & Ulead DVD Picture Show SE 2.0
- Nero Express: Total CD/DVD writing solution
- Software Decoder: For watching DVD Movies
- High Speed Blank DVD media (1 x DVD-R, 1 x DVD-RW)

**Writes:**

DVD-R	(4x)
DVD-RW	(2x)
DVD+R	(4x)
DVD+RW	(2.4x)
CD-R	(16x)
CD-RW	(10x)



(J7075) **\$549**

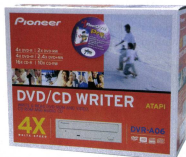
### ReelDVD Pro Kit MAKE PROFESSIONAL DVDS

- ReelDVD LE
- TMPGenc MPEG 1/2 encoder
- Ulead Studio Suite
- Nero Express
- Software decoder
- High Speed Blank DVD Media

ReelDVD

TMPEGenc Plus 2.5  
Light Version

Rent\* \$10.07/wk (J7093) **\$899**



### DVD-A06SZ 16x DVD-ROM



**FEATURES:**

- 16x slot loading DVD-ROM drive (40x for CD)
- Ultra DMA66
- Vertical or horizontal mounting
- 2 year warranty

**SOFTWARE INCLUDED:**

- PowerDVD XP

**BONUS:**

- 5 x DVD movie rental vouchers from Webflicks

(H9625) **\$98**



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## Best Storage Solutions

### d2 External Hard Disks

The LaCie d2 range is a professional flexible system. Made of extruded aluminium and Zamac alloy, which are the same materials used in Formula 1 car designs for their unique features: robustness, lightweight and fast cooling. BD packages include a Kensington cable lock and power lock for excellent security. The drive switches on and off with your computer and features a front power button and blue activity LED. Supplied with drivers for PC. Drives can be used stacked horizontally or can be mounted in a 1U 19" rack (kit sold separately).



Not all items are in stock at all stores but can be ordered for Pick-up or Delivery

Delivery charges extra



80GB 7200rpm USB 2.0	(G1817)	<b>\$369</b>
120GB 7200rpm USB 2.0	(G1281)	<b>\$429</b>
200GB 7200rpm USB 2.0	(G4245)	<b>\$629</b>
Rent* \$7.05/wk		
80GB 7200rpm FireWire	(G1744)	<b>\$389</b>
120GB 7200rpm FireWire	(F7923)	<b>\$450</b>
200GB 7200rpm FireWire	(G3138)	<b>\$645</b>
320GB BD 7200rpm FireWire	(J8536)	<b>\$824</b>
Rent* \$9.23/wk		
400GB BD 7200rpm USB 2.0 & FireWire & F800*	(J0709)	<b>\$1,329</b>
Rent* \$14.89/wk		
500GB BD 7200rpm USB 2.0 & FireWire & F800*	(J0710)	<b>\$1,689</b>
Rent* \$18.93/wk		

\*F800 is a new FireWire interface doubling transfer rate (up to 100MB/s) of current FireWire interface. Requires specific F800 card to take advantage of the performance.



LaCie Data Bank 20GB  
USB & FireWire & design by F.A. Porsche

Rent\* \$7.68/wk (H2008)  
**\$685**

### d2 External CD-R 52x

LaCie CD-R 52x is one of the fastest CD-Recorders on the market, burning a full 700MB CD in less than 2 minutes. It comes complete in the now famous d2 casing, with all software for PC, cables and one CD-R media. Quiet and efficient.



CD-RW 52/24/52 USB 2.0 (H0517)	<b>\$265</b>
CD-RW 52/24/52 Firewire (H0519)	<b>\$295</b>
CD-RW 52/24/52 USB 2.0 & Firewire (H0368)	<b>\$325</b>
CD Duplicator 1-2-1 standalone & connected mode:	
CD Duplicator CDR52+DVD16x USB2.0	
Rent* \$7.79/wk (J0485)	<b>\$695</b>

### Pocket Hard Disks

LaCie Pocket hard disks are the most robust and mobile drives on the market. Made of light aluminium for better cooling and fully moulded in a silicon bumper for protection. Includes USB 2.0 and bus powered Firewire interface, complementary power supply and drivers.



20GB USB 2.0 & FireWire (F5369)	<b>\$359</b>
40GB USB 2.0 & FireWire (F5371)	<b>\$469</b>
80GB USB 2.0 & FireWire	Rent* \$7.83/wk
(J8475)	<b>\$699</b>

LaCie PCI card USB 2.0 4 ports (G4157)

**\$49**  
FireWire PCI Card 4 ports (G8509)  
**\$34**

### d2 external DVD+-R

LaCie CD-RW/DVD+-RW is based on the Pioneer A06 mechanism: DVD-R 4x/DVD-RW 2x/DVD+R 4x/DVD+RW 2x/CD-R 16x/CD-RW 8x.



It comes complete with all software for PC, all cables, one DVD-R and CD-R media.

DVD-R/RW/CD-RW (A06) USB 2.0 & FireWire	
Rent* \$7.49/wk (J6984)	<b>\$669</b>
DVD-R/RW/CD-RW (A06) Internal IDE drive	
(J6983)	<b>\$499</b>

### d2 Ethernet disks



Connect up to 500 users (Mac, PC & Unix) on any type of network. Windows XP embedded. USB 2.0 & Firewire expansion ports to increase capacity easily. Auto-sensing 10baseT & 100baseTX.

7200rpm Ethernet disk			
(80GB)	Rent* \$15.40/wk	(J4511)	<b>\$1,374</b>
(160GB)	Rent* \$17.71/wk	(J4512)	<b>\$1,580</b>
7200rpm 8MB Cache Ethernet disk			
(250GB)	Rent* \$22.39/wk	(J0705)	<b>\$1,998</b>
(500GB)	Rent* \$28.63/wk	(J0706)	<b>\$2,885</b>



LaCie USB Floppy Drive (F8125)  
**\$79**



# EPSON

## The Power to Create

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### Epson Inks

Black  
870/890/895/915  
1270/1290

(C9765) **\$37**

Colour  
810/830/925

(C9764) **\$45**

Black  
890/1270/1290  
(96455) **\$35**

Colour  
870, 890, 895, 915  
(A0630) **\$32**

Black  
C41UX/SX

(F7743) **\$20**

Colour  
C41UX/SX

(F7742) **\$33**

Black  
C80/C61/CX3100  
(D0043) **\$52**

Colour  
C80/C61/CX3100  
(D0044) **\$47**

### Epson Paper

Premium Glossy  
Photo Paper  
100 x 150mm



(H9042) **\$9**

Photo Paper (A4)



(39631) **\$20**

Photo Quality  
inkjet paper



(77273) **\$29**

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### EPSON STYLUS PHOTO 935



- 5760 optimised dpi using RPM technology
- 4 picolitre Micro Dots, for extremely fine print detail
- EPSON Intelligent Ink system
- True Border-free edge-to-edge printing on cut sheet or roll paper
- Roll paper holder included
- Blue tooth optional
- USB direct printing
- Direct printing via camera card
- CDR & Zip capabilities
- Optional LCD Preview Monitor.

Rent\* \$7.19/wk (J5616)

**\$642**

### PERFECTION 3200 SCANNER



- 3200 x 6400dpi optical resolution
- 48-bit colour depth
- Optical Density: 3.4 Dmax
- USB2.0 and IEEE1394 (Firewire) interfaces
- Lid type film adapter with 4 x 5" scanning area
- Scan up to two film strips of up to six 35mm frames (total of 12 frames)
- Adobe Photoshop Elements and LaserSoft SilverFast SE6 bundled
- 1 year warranty

Rent\* \$8.95/wk (H8527)

**\$799**

### EPSON STYLUS C61



- Crisp text, vibrant colours coupled with speed and reliability
- Up to 14ppm black text A4 (memo) printing
- 5760 x 720 Optimised dpi using RPM technology
- USB and Parallel enabled.

(F8180)

**\$179**

### EPSON STYLUS PHOTO 830U



- 6-colour ink system
- Up to 14ppm black text printing
- A4 economy
- 5760 optimised dpi using RPM technology for true photo quality
- MicroPiezo technology
- Incredible fine 4 picolitre ink droplets
- True Border-free printing
- 2 x USB interface
- Photo Quicker 3.4
- up to 25 years lightfastness.

(J2312)

**\$259**

### EPSON STYLUS PHOTO 2100



- Up to 2880 x 1440 dpi
- 7 colour individual ink system with a new light black and either photo or matte black
- A3+ • Epson Intelligent Ink system
- True Border-free printing
- Roll paper printer and auto cutter
- 75yrs lightfastness
- Up to 1.3mm thick media support.

Rent\* \$20.05/wk (F2969)

**\$1,789**

### EPSON STYLUS PHOTO 1290S



- A3+ • 6 colour photo printing
- Border-free edge-to-edge printing
- Max res 2880 x 720dpi with variable sized droplet technology
- Over 25 years lightfastness prints
- Features print image matching technology
- On demand inkjet (piezoelectric)
- Black text 9.4ppm (economy)
- Text & photo 3.0ppm (normal)
- Full page colour 1.3ppm (normal).

Rent\* \$10.97/wk (G4593)

**\$979**

### MONO LASER PRINTER EPL-6100



- Fast 16ppm print engine
- True 1200dpi for superior print quality
- Powerful, 200MHz 64-bit RISC CPU
- Standard Memory: 8Mb
- Class leading durability - 15,000 pages per month duty cycle
- 6,000 page toner cartridges
- Superb paper handling
- 250 sheet paper input, Network capable.

Rent\* \$7.79/wk (F3399)

**\$695**

### COLOUR LASER PRINTER AL-C900



- The AcuLaser C900 is perfect for printing a wide range of professional office documents such as in house stationary, brochures, direct mail and flyers, customer and internal newsletters, web prints, business reports and submissions.
- Printing up to 2400 dpi
- 16ppm black/4ppm colour

Rent\* \$17.36/wk (G8809)

**\$1,549**

### MULTIFUNCTION PRINTER HOME CX3100



- Printing - colour printing up to 5760 Optimised DPI up to 14ppm (black-and-white economy mode)
- Standalone - full colour copier capabilities
- Scanning - 48-bit colour depth (internal) scanning
- Faxing - Using your existing PC and modem take full advantage of your existing fax software.

(H0697)

**\$294**

### MULTIFUNCTION PRINTER OFFICE CX5100



- Printing - colour printing up to 5760 Optimised DPI
- up to 22ppm A4, black-and-white economy mode
- Standalone - full colour copier
- Scanning - 48-bit colour depth
- Faxing - Using your existing PC and modem take full advantage of your existing fax software.

(H0780)

**\$499**

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TECHNOLOGY™

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\* The figures quoted are based on a per week basis over 3 years. T.A.P. Terms and Conditions apply.

# Advance technology ...

**Canon**  
advanced simplicity

New digital cameras.....

Not all items are in stock at all stores but can be ordered for Pick-up or Delivery

Delivery charges extra

## PowerShot A300

DIGITAL CAMERA



- Compact and stylish 3.2 Megapixel digital camera with Canon 5x digital zoom
- Direct printing using only the PowerShot A300 and Canon direct photo printer
- Movie recording and playback with sound - 640 x 480 and 320 x 240

(H9815) **\$495**

## PowerShot A70

DIGITAL CAMERA



**NEW**

- Compact and stylish 3.2 Megapixel digital camera with Canon 3x optical zoom lens.
- 12 shooting modes, from complete control to full automatic mode allowing manual selection of aperture and shutter speeds.
- Movie recording and playback with sound - 640 x 480 and 320 x 240

Rent\* \$7.56/wk (H2206)

**\$675**

## PowerShot A80

2.0MP



Rent\* \$6.66/wk (H2209)

**\$595**

## Digital IXUS II



- Ultra compact stainless steel 3.2 Megapixel digital camera
- Fully retractable Canon 2x optical zoom lens
- Selectable 9-point AIAF and single centre point AF
- Continuous movie recording, playback with audio and on-camera editing for up to 3 min
- Supplied with 16MB SD Storage Card

Rent\* \$9.85/wk (J2473) **\$879**

## PowerShot S50

DIGITAL CAMERA



- 5 Megapixel 1/1.8" CCD image sensor records 2592 x 1944 pixels.
- High resolution Canon 3x f/2.8-4.9 aspherical zoom lens
- Selectable 9 point AIAF
- Manual and automatic shooting modes
- 3 light metering modes, and selectable sensitivity from ISO50 to 400.

Rent\* \$15.41/wk (H2210) **\$1,375**

## Digital IXUS 400

4.0MP



Rent\* \$11.15/wk (H2207)

**\$995**

## Super thin Film Scanner



**NEW**

(K1014) **\$399**

## LIDE 80 film scanner

- Document and film scanning with style and speed.
- 2400 x 4800 dpi optical resolution and 48-bit colour document and film scanner
- Single USB lead transfers data and provides power
- Four one-touch buttons Scan/Copy/ File/E-mail
- PDF File function

## CanoScan 3000 F



- Film scanning
- 1200 x 2400 dpi optical resolution with 48-bit input depth.
- Advanced Z-LID keeps books and other bound documents flat on the scanner for evenly lit scans.
- Fast scanning thanks to the USB 2.0 Hi-Speed interface.

(H2228) **\$269**

## PowerShot G3

4.0MP



Rent\* \$15.41/wk (G4632)

**\$1,375**

## PowerShot G5

5.0MP



Rent\* \$17.59/wk (J5722)

**\$1,570**

## LIDE 20

600 x 1200 dpi



(F9858) **\$139**

## LIDE 30

1200 x 2400 dpi



(H2229) **\$199**

## LIDE 50

1200 x 2400 dpi



(H2230) **\$224**

## CS 5000 F

2400dpi film scanning



(G4633) **\$349**

## CS 8000 F

2400dpi film scanning



(G5524) **\$499**

## CS 9900 F

3200dpi film scanning



Rent\* \$8.50/wk (H2231) **\$759**

## ... simple to use

Not all items are in stock at all stores but can be ordered for Pick-up or Delivery

Delivery charges extra

Fyshwick Business Centre  
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IN ACT!

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### Laser Printer

#### Laser Shot LBP-2410



Colour Laser Printer

- 16ppm mono, 4ppm colour
- Zero warm up time
- Fastest first page to print
- No extra RAM required
- Optional network printing
- USB 2.0 high speed connectivity for fast data transfer

Rent\* \$19.04/wk

(J2427) **\$1,699**

#### LBP-1120 Laser Printer



- True 10 ppm • With instant warm up
- 600 dpi • Canon Advanced Printing Technology (CAPT) • All-in-one cartridge • Cost-saving toner save mode • Switches to standby mode within seconds of finishing a print job
- Exceptionally small and light, low noise and power consumption

(G4580) **\$329**

#### LBP-2000 Laser Printer



- 20 ppm (A4), 11 ppm (A3)
- 1200 x 600 dpi
- Memory: Standard: 8Mb on board, Fast 11 second first print speed
- Get up to 10,000 A4 pages from a single toner

Rent\* \$16.56/wk (E1235) **\$1,469**

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advanced simplicity

### New Printers.....

Ask About...



- ☐ Extend to a total of 3 Years Return to Base
- ☐ Extend to a total of 5 Years Return to Base
- ☐ Upgrade Return to Base of Warranty Extension to On-Site

#### RENTSMART

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SEP

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**NEW!**

#### i250 bubble jet printer

- Print up to 10ppm in mono
- Up to 7ppm in colour
- Up to 2400 x 1200dpi resolution
- Borderless 6" x 4" photo prints

(K0904) **\$99**



#### S200SPx bubble jet printer

- Up to 2880 x 720 dpi resolution.
- Cost-saving permanent print head technology.

(H2211) **\$75**



#### i470d bubble jet printer

- 4800x1200 dpi print resolution
- 2 picolitre ink drops
- Camera direct and memory card direct printing
- Borderless photo prints up to A4 size

(J2419) **\$349**



**A3 size**

#### i6100 bubble jet printer

- Print up to 12ppm in mono
- 2400x1200 dpi print resolution
- 5 picolitre ink drops
- Up to A3+ size printing - 329x483mm

(J2420) **\$549**



- 6 individual ink tanks
- 4800 x 1200dpi print resolution
- 6" x 4" and A4 borderless photo printing
- Colour Graphics: approx.7ppm

Rent\* \$7.16/wk (H2220)

**\$639**



**NEW!**

Bonus Software "Photo Record Gold"

#### i350 bubble jet printer

- Print up to 12ppm in mono
- 4800 x 1200 dpi resolution
- Direct printing from compatible Canon digital cameras.
- USB & Wireless Infrared interfaces.

(K0905) **\$139**



#### i450 bubble jet printer

- Print up to 18ppm in mono
- 4800x1200dpi print resolution
- 2 picolitre ink drops
- Borderless photo prints up to A4 size

(J2418) **\$195**



**NEW!**

#### i560 bubble jet printer

- Print up to 18ppm in mono
- Up to 11ppm in colour
- Up to 4800 x 1200 dpi
- Individual ink tanks for low running costs

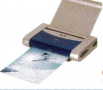
(K0909) **\$299**



#### i850 bubble jet printer

- Print up to 22 ppm in mono
- 14 ppm in colour
- Economical individual ink tanks
- High resolution 4800 x 1200 dpi printing

(H2218) **\$339**



#### i70 bubble jet printer

- Print up to 13ppm in mono
- 4800 x 1200 dpi resolution
- Direct printing from compatible Canon digital cameras.
- USB & Wireless Infrared interfaces.

(H2219) **\$399**



# Multifunction (All-In-One)

**Canon**  
advanced simplicity

Small Office / Home Office (SOHO)

**Print, copy, scan:**

**imageCLASS MPC190**



- Mono Copy: up to 14 cpm
- Colour: up to 10 cpm
- Mono Printing: up to 14 ppm
- Colour Printing: up to 10 ppm
- Printing Resolution: 2400 x 1200 dpi
- Scanner Resolution: 600 x 1200 dpi
- USB

(H2216)

**\$269**

**Print, copy, scan, memory card printing.**

**imageCLASS MPC200**



(G4582)

**\$299**

- Printing (up to 14 ppm black, 10 ppm colour)
- Borderless printing and copying on A4 and 4" x 6"
- Scanning resolution 600 x 1200 dpi
- Copying (14 cpm black/10 cpm colour)
- Included software MultiPASS Suite, V4.3, OmniPage SE, Easy Photo Print and Acrobat Reader 5.0

**Professional, colour printer, copier and scanner. All-in-one**

**imageCLASS MP700**



(J2415)

**\$515**

- Borderless printing and copying on A4 and 4" x 6"
- Prints directly from a digital camera's memory card
- Printing (up to 22 ppm black, 14 ppm colour)
- Economical separate ink tanks
- Scanning up to 1200 x 2400 dpi
- High-speed copying (22 cpm black, 14 cpm colour)
- Software including Easy-PhotoPrint, Easy-WebPrint, Presto! PageManager, OmniPage SE (OCR software) and Acrobat Reader 5.0

**The Ultimate All-in-one Printer, Copier, Scanner, Fax with ADF and direct memory card printing.**

**imageCLASS MP730**



(J4652)

**\$699**

- Prints and copies of up to 22 ppm black and 14 ppm in colour
- Prints directly from a digital camera's memory card
- Exceptional print resolution of up to 4800 x 1200 dpi
- True borderless prints and copies on 4" x 6" and A4 paper
- Super 33.6 Kbps fax modem for fast fax transmission
- 30-page Automatic Document Feeder
- Separate ink tanks
- Special functions such as Image Repeat, Mirror Image and Entire Image

**Canon**  
advanced simplicity

Small Business / SME

**Digital copier and laser printer all-in-one**

**imageCLASS D620**



Rent\* \$10.63/wk

(F2023)

**\$949**

- Laser copy quality (600 x 600 dpi)
- High print resolution (600 x 600 dpi)
- All-in-one cartridge: no maintenance
- Electronic sorting of copies
- Canon's exclusive RAPID Fusing System for no warm-up time
- Copying Speed: 12 cpm
- Printing Speed: up to 12 ppm
- Paper Capacity: 250-sheet paper cassette

**A professional digital copier, laser printer and fax with automatic document feeder:**

**imageCLASS D680**



Rent\* \$13.43/wk

(58274)

**\$1,199**

- Laser copy quality (12 cpm, 600 x 600 dpi)
- Huge fax memory of 79 pages
- High print resolution (12 ppm 600 x 600 dpi)
- All-in-one cartridge: no maintenance
- Electronic sorting of copies
- Network printing with optional network adaptor
- 30-sheet Auto Document Feeder

**Digital copier and laser printer all-in-one**

**imageCLASS D320**



Rent\* \$12.31/wk

(J2413)

**\$1,099**

- Laser copy quality (14 cpm, 600 x 600 dpi)
- High print resolution (14 ppm, 600 x 600 dpi)
- All-in-one cartridge: no maintenance
- Electronic collating of copies in the correct order
- 2-on-1 copy to fit two originals onto one A4 page
- Canon's exclusive RAPID Fusing System for no warm-up time

**All-in-one digital copier, laser printer and fax with automatic document feeder:**

**imageCLASS D380**



Rent\* \$14.43/wk

(K0867)

**\$Call**

- Copy (14 cpm, 600 x 600 dpi) Print resolution (14 ppm, 600 x 600 dpi)
- Huge fax memory of 256 pages
- 50-page Automatic Document Feeder (ADF) for fast unattended copying and faxing
- 130 speed dials for easy access to frequently used numbers
- All-in-one cartridge: no maintenance

Not all items are in stock at all stores but can be ordered for Pick-up or Delivery

Delivery charges extra

**Fyshwick Business Centre**  
**NOW OPEN IN ACT!**

**Ask About...**  
**EXTENDED WARRANTY**

- ☐ Extend to a total of 3 Years Return to Base
- ☐ Extend to a total of 5 Years Return to Base
- ☐ Upgrade Return to Base of Warranty Extension to On-Site

**RENTSMART**

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**Fax: 1300 13 6666 Email: [sales@ht.com.au](mailto:sales@ht.com.au)**

**This catalogue valid**  
**01/09/2003 to 30/09/2003**



# HP Scanjets, Deskjets, Photosmart Printer

Not all items are in stock at all stores but can be ordered for Pick-up or Delivery

Delivery charges extra

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Parramatta Business Centre

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See Page 2 for Locations

SEP 42

## hp DeskJet 3550 **NEW!**



- HP photoREt 3 colour layering technology
- Up to 2400-optimised dpi in colour
- Up to 1200-rendered dpi black
- Up to 14 ppm (black) and up to 10 ppm (colour)
- USB connection compatible with PCs and Macintosh computers

(J9349) **\$90**

## hp Deskjet 3650 **NEW!**



- HP photoREt 3 colour layering technology with optional 6-ink printing produces virtually grainfree and true-to-life photos
- Up to 4800 x 1200-optimised dpi colour and 1200-input dpi.
- Up to 17 pages per minute (ppm) in black and up to 12 ppm in colour print speeds
- USB connection compatible with PCs and Macintosh computers

(K0313) **\$135**

## hp Deskjet 5160 **NEW!**



- Up to 4800-optimised dpi in colour
- HP photoREt 4 colour layering technology with optional 6-ink photo printing
- 1200 dpi laser-quality in black
- Up to 19 ppm (black) and up to 14 ppm (colour) print speeds
- USB connection compatible with PCs and Macintosh computers

(J9813) **\$199**

## hp Deskjet 5652



- Up to 21ppm black and up to 15 ppm colour print speeds
- Up to 4800-optimised dpi in colour
- 1200 dpi laser-quality in black
- HP photoREt 4 colour layering technology with optional 6-inkphoto printing
- USB connection compatible with PCs and Macintosh computers

(K0316) **\$269**

## hp Scanjet 3970 **NEW!**



- **Input modes** front panel scan, copy, HP Instant Share™, HP Memories Disc Creator, HP Photo and Imaging software
- **Additional features** integrated Transparent Materials Adaptor (TMA) in scanner lid; CCD technology; OCR software

- **Hi-Speed USB** – compatible with USB 2.0 specifications; supports Microsoft® Windows® and Macintosh, HP Photo and Imaging software
- **2400 dpi optical resolution**, 2400 x 2400 dpi hardware resolution bit depth 48-bit colour max document size 216 x 297 mm (8.5 x 11.7 inches)

(J9853) **\$399**

## hp Scanjet 3670 **NEW!**



- **Input modes** front panel scan, copy, HP Instant Share™, HP Photo and Imaging software
- **Additional features** TMA built into scanner lid; new, small product ID; 3-button front panel (scan, copy, or launch HP Instant Share™); USB connectivity; HP Photo and Imaging software, CCD technology, OCR software
- Resolution 1200 dpi optical resolution, 1200 x 1200 dpi hardware resolution • Imaging technology CCD
- Bit depth 48-bit colour • Max document size 216 x 297 mm (8.5 x 11.7 inches)

(J9829) **\$249**

# HP Consumables

## HP paper special offering

Not all items are in stock at all stores but can be ordered for Pick-up or Delivery

Delivery charges extra

### HP q1952a

Colourfast photo paper, 4R (4"x6"), 240gsm, 20 sheets

(G0321) **\$15**

### HP c7006a

Semi gloss photo paper, A4, double-sided, 160gsm, 25 sheets

(C6840) **\$13**

### HP c6765a

Glossy photo paper, A4, 175gsm, 20 sheets

(B1524) **\$15**

### HP q1936a

Premium inkjet paper, A4, 100gsm, 200 sheets

(D9329) **\$35**

## Ink cartridges



No 29 Black Inkjet Cartridge

(21919) **\$63**



No 45 Black Inkjet Cartridge

(22643) **\$59**



No 78 Tri Colour Inkjet Cartridge

(86183) **\$65**

## HP toner



HP C4092a LaserJet print Cartridge for hp 1100, 3200, 2500 page Toner (70459) **\$128**



HP C7115x LaserJet Black Print Cartridge for 4M, 4+/M+, 5N/Cr (D0031) **\$158**



HP C4096a LaserJet BlackPrint Cartridge for 4M+/M+/5/5M/5N 8800 Page Toner (73192) **\$207**

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Perth, WA

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# SimpleTech

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www.ht.com.au/cat/simpletech

## Memory Solutions & Technology

Now you can collect Fly Buys points when you purchase from

HARRIS TECHNOLOGY



### Secure Digital

Features a write protect switch on the side of the card. Also features cryptographic security for copyrighted data based on Secure Digital Music Initiative portable device requirements. It's designed for unlimited compatibility with digital cameras, music players, and other devices that use Secure Digital (and MultiMedia Card).

• Lifetime warranty, Secure Digital Card Range.

32MB (G9385) **\$49**

64MB (G9390) **\$75**

128MB (G9395) **\$118**

256MB (H0296) **\$209**

512MB (H5011) **\$679**

### Bonzai USB Mini-Drive

Use to store, transfer and carry your business documents to work anywhere you travel. Carry favourite digital pictures, MP3 music, video and audio clips to share with family and friends. Even store games for a little fun between projects. • SD or MMC flash card expandable • USB interface • 1.5MB/second transfer rate.

62MB (G9372) **\$109**

128MB (G9373) **\$168**

258MB (G9374) **\$245**

### USB ThumbDrive

SimpleTech's new USB Flash Drive is a small, portable, and convenient replacement to floppy disks, CDs, and more. One 256MB USB Flash Drive offers as much storage capacity as up to 177 standard floppy disks.

• Hot swap functions • 1.5MB/second transfer rate • LED indicates drive is in use • No external power required • No cables or adapters required • Windows 98SE/ME/2000/XP; MacOS 8.6

128MB (J9079) **\$86**

256MB (J9080) **\$163**

### VEO SD Camera

• 640x480 digital resolution. • Takes 24-bit full colour photos. • Transferred images are standard JPEG pictures. • Automatic exposure, white balance and colour control. • Palm OS plug-and-play capability. • Swivel lens with adjustable focus. • Full featured software for managing images and transferring to the PC.

(I0116) **\$199**

Fast Delivery Australia-Wide

SEP

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01/09/2003 to 30/09/2003

# Kodak

HT Web Direct

[www.ht.com.au/cat/kodak](http://www.ht.com.au/cat/kodak)

## Share Moments. Share Life™

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Delivery charges extra

**Kodak**



**PICTURE CARDS**

**32MB Picture Card (G2677)**

**\$57**

**64MB Picture Card (G2249)**

**\$63**

**128MB Picture Card (A5253)**

**\$105**

### Kodak EasyShare Printer Dock 6000



- Create great looking, borderless 4" x 6" (10cm x 15cm) photos at the touch of a button
- Treasure your prints for a lifetime – Xtralife lamination makes them durable and waterproof
- Get back to working quickly – the printer dock recharges your Kodak camera's battery
- Transfer your pictures from camera to computer at the touch of a button
- Works with all Kodak EasyShare CX/DX 6000 and LS 600 series cameras
- Use it with or without a PC
- Share your pictures with ease – even view a slide show on your TV

**Includes:** Kodak EasyShare printer dock 6000

- 10-count sample photo paper kit and Kodak colour cartridge
- Ni-MH rechargeable battery pack for select Kodak EasyShare digital cameras
- 24V AC adapter
- Kodak printer driver software
- Cleaning tool
- Welcome kit

Kodak Printer Dock (J2687) **\$489**

Kodak Printer Dock Media Kit (J8824) **\$45**

### Kodak LS443



- 4.0 megapixel
- 10x zoom (3x optical, 3.3x digital)
- Focus distance: 0.6m (2ft.) to infinity
- Exposure control: TTL-AE (multi-pattern - matrix metering, centre weighted, centre spot)
- Flash mode: automatic, fill, red-eye, off
- 1/4 in. standard tripod mount
- 10 seconds self timer
- Selectable date/time stamp
- Kodak EasyShare Li-Ion rechargeable battery

Rent\* \$9.74/wk (G1816) **\$869**

### Kodak EasyShare CX6200

**Kodak**



**Ultra Glossy 15 sheets (B1656)**

**\$14**

**Satin 15 sheets (D3251)**

**\$15**

**Satin 75 sheets (D3258)**

**\$35**



- 2.0MP for great-looking prints up to 20cm x 25cm
- Bright 4cm LCD screen
- Video clip capture to catch life in motion
- Crisp, sharp pictures with a Kodak 37mm (35mm equivalent) lens with 3x continuous digital zoom
- Exceptional colour quality under any lighting conditions with Kodak colour science inside
- 8MB internal memory and MMC/SD expansion card slot
- Compatible with Kodak EasyShare 6000 series docks

(K0475) **\$239**

### Kodak CX6330

- 3.1 megapixel (2032x1524 pixels)
- 3x optical zoom, 37-111mm (35mm equivalent)
- 3.3x Advanced Digital Zoom
- Focus distance: 0.6m (2 ft.) to infinity
- Display: LCD - 1.6" (4cm) door/outdoor display
- Flash range: wide 0.6 - 3.6m (2 - 11.8 ft.); tele - 0.6-2.1m (2 - 6.9 ft.)
- White balance: automatic
- Self-timer: 10 seconds



Rent\* \$6.49/wk (J5940) **\$579**

### Kodak DX6340

- 3.1MP for prints up to 11" x 14" (28cm x 36cm)
- 4x optical zoom
- Professional-quality Schneider-Kreuznach Varigon lens
- 3.5x Advanced Digital Zoom, 14x total zoom
- 1.8" (45.7mm) high resolution Indoor/Outdoor display
- Auto picture rotation



Rent\* \$7.56/wk (J2683) **\$675**

SEP

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# Video Editing Tools

## Watch & Record TV on your PC

### PCTV

- High quality TV tuner or hyper band cable and terrestrial antenna reception
- Real Time MPEG1-, MPEG2-, DV - software compression with presets for VideoCD, SuperVCD, DVD format
- Direct Burn-to-disc of recorded MPEG1 and MPEG2



- Still image capture with digital image improvement from TV and connected analogue video sources
- Time-shifting feature lets you pause or replay while recording a live show
- Easy-to-use timer for scheduled recording

(80290)

**\$125**

## INSTANT - Perfect CD & DVD duplication

### INSTANT CD / DVD



- Instant copy: CD/DVD copy
- Instant Backup: to backup & restore your files & drives
- Instant Write: lets you use your CD-R, CD-RW & DVD RAM like a floppy
- Instant Music: music arranger program
- Expression: CD/DVD authoring for still images & videos & CD label designer
- Instant Drive: virtual CD-ROM drive

(H9522)

**\$149**

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Delivery charges extra

IT & T AWARDS  
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OF THE YEAR  
**2002**

## STUDIO - First step, quick & easy video editing

The complete home movie-making package for video editing novices

### MOVIE BOX DV

- Includes full version of Studio 8 editing software
- Designed by F.A. Porsche
- Capture and output Analogue and Digital video
- Simply connects to a FireWire port on your PC or Laptop



"Also doubles as an AV/DV Converter"

Rent\* \$7.56/wk

(J2406)

**\$675**

### STUDIO DELUXE

- Analogue & Digital Video editing & DVD authoring hardware/software solution
- Includes full version of studio 8 editing & DVD authoring software
- Includes analogue and DV breakout box for video/ audio connections
- Includes additional 3D Hollywood FX transitions



Rent\* \$6.66/wk (F9330)

**\$595**

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## Edition 5 - Real-time Editing Packages

### EDITION 5 DV



- Real-time editing without a real-time card
- Stability. Edition 5 is the most stable editing software in it's class
- Scalable technology - As PC's get faster you will get more real-time features
- DVD Authoring direct from the timeline with motion backgrounds, menus and buttons
- Includes FireWire card

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(J2407)

**\$1,499**

### EDITION 5 PRO



- Real-Time Analogue output
- Includes AGP Accelerator card for Superior Real-Time performance
- Real-time CPU and GPU based effects
- Real-Time Hollywood FX
- Plus all the features of Edition 5 DV !!

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## Multimedia Tools

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### Vegas® 4.0

#### REALTIME PREVIEW THROUGH FIREWIRE

Is the professional's choice for video editing, audio production, compositing, titling and advanced encoding on the PC platform. Vegas provides a complete and integrated solution for digital video production, audio recording, editing and mixing, streaming content creation, and surround sound production. Vegas 4.0 provides real-time previewing of effects and transitions from the timeline without needing to render, through any OHCI firewire card - even on a notebook!

### Vegas® 4.0 + DVD

Includes DVD Architect, a powerful DVD Authoring tool which includes a Dolby Digital AC3® Encoder! DVD Architect works seamlessly with Vegas 4.0, providing video professionals and DVD producers with a complete solution for DVD authoring. Vegas 4.0 markers are automatically recognised and imported into DVD Architect as chapter points.

(H1946) **\$769**

(H1952) **\$1,245**

Sound Forge 6  
(B8616)

**\$562**

Video Factory  
(D1566)

**\$219**

Hauppauge  
TV - GO  
(89063)

**\$155**

WinTV Radio  
(H1477)

**\$214**

### TV Tuner Card & Video Recorder



PVR 350 now with TV Video Out! Now you can record TV programs in DVD quality and play them back on your TV! Use your PC as a true Digital VCR! PVR 350 includes FM tuner. PVR 250 and PVR USB offers playback to your PC display.

Hauppauge PVR 250 (G5990) **\$429**

Hauppauge PVR 350 (H3814) **\$525**

### Hauppauge TV USB



The Hauppauge TV USB and TV USB FM allow you to watch TV on your notebook using its USB interface. The compact external unit also accepts video from a VCR or camera. Basic capturing functionality is also provided

TV USB

(89066) **\$255**

TV USBFM Radio

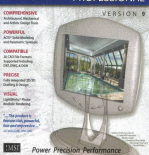
(98455) **\$309**



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TurboCAD Professional is a versatile design application with professional power. If you're looking for a complete drafting & design solution, TurboCAD Professional is the answer. TurboCAD 9 delivers unmatched performance and ease of use in desktop CAD. Comprehensive 2D power is seamlessly integrated with advanced 3D modeling in a familiar Windows® environment.



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<b>Advanced Mechanical Design</b> <ul style="list-style-type: none"> <li>• ACIS® Version 8 Solid Modeling Engine</li> <li>• Facet Editing of ACIS 3D Objects</li> </ul>	<b>Superior Compatibility</b> <ul style="list-style-type: none"> <li>• Fluent in 27 Industry Standards File Formats</li> <li>• Open, Edit &amp; Save AutoCAD® DWG/DFX Files</li> <li>• MicroStation® DGN, 3DS, IGEN and NEW STL Formats</li> <li>• Publish to HTML, JPG, MTX</li> </ul>
<b>Intelligent Architectural Design</b> <ul style="list-style-type: none"> <li>• Self-Healing 2D &amp; 3D Walls</li> <li>• Parametric Roofs with Openings</li> <li>• Floor Plan 3D Software Included</li> </ul>	<b>Programmable</b> <ul style="list-style-type: none"> <li>• Includes complete Software Development Kit with the NEW VisualBasic® Macro Recorder</li> </ul>

TurboCard v9 Professional full version

(J3494) **\$1,035**

Upgrade

(J4994) **\$450**

Also available: TurboCard Standard v9

(J3323) **\$179**

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## Video & Multimedia Tools

### No Limits Realtime Editing

#### DVStorm2 Platinum Sales Celebration Crossgrade Offer

- Crossgrade to DVStorm2, EDIUS and a WF-17 (Canopus Dual-head display card) from any editing product at the price of a DVStorm2 \$1999
- or
- Crossgrade to DVStorm2 Lite (no hardware encoder) and EDIUS from any editing product at the price of a DVStorm2 Lite \$1699



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#### DVStorm2

DVStorm2 delivers the industry's highest-quality DV and MPEG, breakthrough realtime performance and a professional, stable studio environment.

- Fast on board MPEG encoding
- MPEG tools for capture, cutting and re-encoding.
- Includes Ulead's DVD Workshop SE.
- 3D Picture in Picture Controls.
- Additional filters
- "One-pass" scene capture utility.
- EDIUS directly supports and requires either DVStorm, DVStorm2, DVREX RT or DVREX RT Professional.

- (Conditions apply: Crossgrade customers must supply product serial number, manufacturer and either the product manual front cover or purchase invoice. Offer ends soon.)

#### EDIUS

##### Key EDIUS Features

- Floating window user interface for easy workspace customization.
- Realtime video filters & 3D transitions
- Unlimited realtime video and audio tracks
- Unlimited realtime graphic and title layers
- Output MPEG-1&2, Windows Media / RealVideo/ Quicktime.
- EDIUS directly supports and requires either DVStorm, DVStorm2, DVREX RT or DVREX RT Professional.

DVStorm2 (G1647) **\$1,999** DVStorm2 Lite (K0158) **\$1,699** EDIUS (J4993) **\$599**



ACEDVio

#### CANOPUS ACEDVio - One card for all Video Editors

ACEDVio is the world's only analog and DV editing card that is completely compatible with hundreds of video editing applications and all widely used video equipment.

- Provides analog and DV I/O: Final Cut Pro, XpressDV, Premiere, Vegas, Edition, Media Studio Pro, and Windows Movie Maker.
- Connects to all widely used analog and DV cameras and decks including: VHS, S-VHS, Hi-8, Digital8, DV and DVCAM (PAL & NTSC standards support).

Includes: Sonic Foundry® Vegas® 4.0 ACEDVio (J4950) **\$999**



DVRaptor RT2

Canopus DVRaptor RT2 sets a new standard in performance and price by providing render-free realtime multi-track DV editing. With DVRaptor RT2 there is no rendering and no waiting to enjoy high-quality realtime DV output of 3D transitions, video tracks, filters, titles and graphic layers. Includes Ulead DV Workshop SE.

DVRaptor RT2 (H2263) **\$1,080**

Free Canopus Power Tools

DVRaptor RT2/ADVC50 Option (H2264) **\$1,389**

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(D4514)

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ADVC100

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Professional edition	(J6099)	<b>\$189</b>
Also available Publish PDF	(J6097)	<b>\$99</b>

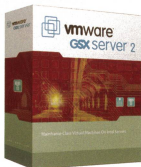
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Server edition*	(K0621)	<b>\$5,199</b>
Also available VMware for workstation	(J4811)	<b>\$599</b>

\* Including 1 year renewable Gold Level support/subscription

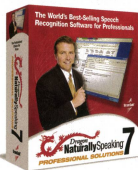


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Dragon NaturallySpeaking Professional V7.0	(J0745)	<b>\$1,799</b>
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<b>Plugin packs</b>	
Voice Perfect MediSpeak	(F4109)
Voice Perfect LegalSpeak	(G9810)
Perfect BizSpeak	(H8880)

**\$2,099**

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(I0323)

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(J3331)

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(J2866)

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(G0212)

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(G0193)

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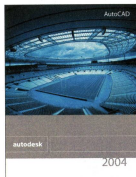
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Bring your designs alive with Autodesk VIZ 4, a multimedia software tool that provides a visually rich, 3D, interactive user interface Autodesk® VIZ 4 is easy to use & is interoperable with AutoCAD® applications. Upgrades also available.

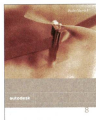
(E1065) **\$3,785**



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From concept sketches, information graphics and floor layouts to presentations, electrical drawings and home project plans, you can draw it - quickly and accurately - with AutoSketch® Release 8 software.

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Volo™ View 3 software is a cost-effective, easy-to-use, digital design viewing solution that lets everyone on your team electronically review, mark up, measure, and plot AutoCAD® and Autodesk® Inventor™ based drawings. Upgrades also available.



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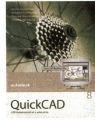


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# Antivirus and Internet Security Solutions

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Network/Gateway Server Protection	•	•	•
Centralised Management Capability	•	•	•
First year maintenance	•	•	•
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PDA Antivirus Protection		•	
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**10 USER PACK** (K1585) **\$1,080**

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January 2003



**Your Virus Protection and Internet Security Solution**

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Plus,

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- New! Proactive virus outbreak notification
- Personal Firewall defence against Hackers
- Integrated PDA Protection



\*Special Download price

(K1266) **\$49**

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**New Release!**

## Symantec AntiVirus™ Small Business Edition 8.1

A complete, licence-in-a-box antivirus solution for workstations and network servers Symantec AntiVirus™ Small Business Edition protects workstations and network servers with the world's best selling and most powerful virus protection. In one easy-to-deploy, licence-in-a-box solution, it provides Symantec's award-winning technology to deliver superior value and protection from Internet-based threats including viruses, Trojan horses, malicious ActiveX code and Java applets.

5 User (J8948) **\$459**  
 10 User (J8949) **\$859**  
 25 User (J8954) **\$1,899**



**New Release!**

## Symantec AntiVirus™ Small Business Edition 8.1 with Symantec AntiVirus/Filtering with Microsoft Exchange

Complete virus protection for workstations, network servers and Microsoft® Exchange servers

Symantec AntiVirus™ Small Business Edition with Symantec AntiVirus/Filtering for Microsoft® Exchange protects workstations and network servers with the world's best-selling and most powerful virus protection while delivering comprehensive protection for Microsoft® Exchange servers by automatically removing viruses and filtering email content. In one easy-to-deploy, licence-in-a-box solution, it provides superior value and protection from Internet-based threats while providing support for Microsoft's Virus Scanning API to ensure trouble-free operation.

5 User (J8958) **\$659**  
 10 User (J8961) **\$1,159**  
 25 User (J8962) **\$2,499**

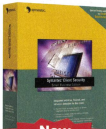


**New Release!**

## Symantec™ Client Security Small Business Edition 1.1

Integrated antivirus, firewall and intrusion detection security for clients Symantec™ Client Security Small Business Edition provides superior protection for client workstations and laptops against complex Internet threats, such as Nimda and Code Red. As the first small business security solution to combine antivirus, firewall and intrusion detection technologies into one complete, licence-in-a-box solution, Symantec™ Client Security enhances security effectiveness while dramatically simplifying management.

5 User (J8963) **\$999**  
 10 User (J8964) **\$1,899**



**New Release!**

## Symantec AntiVirus™ Multi-Tier Protection for Small Business

Complete virus protection for Internet email gateways, network servers and workstations, as well as Lotus® Domino™ and Microsoft® Exchange mail servers Symantec AntiVirus™ Multi-Tier Protection for Small Business protects Internet email gateways, network servers and workstations, as well as Lotus® Domino™ and Microsoft® Exchange mail servers with the world's best-selling and most powerful virus protection. In just one product suite, it provides Symantec's award-winning, best-of-breed technology to deliver a complete and easy-to-use licensed solution, while affording superior protection from Internet-based threats and providing complete email protection at every network tier.

5 User (J8966) **\$859**  
 10 User (J8967) **\$1,599**

# The leader in Internet Security

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### Norton Internet Security™ Standard



Provides essential protection from viruses, hackers, and privacy threats.

**Includes:**

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- Norton™ Spam Alert and
- Norton™ Parental Control

Single User (G0279) **\$119**

5 User (G1162) **\$359**

### Norton Internet Security™ Professional



Protects you and your business from online threats. It keeps your PC safe from viruses and hackers and safe-guards your privacy.

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- Norton™ Spam Alert and
- Norton™ Productivity Control

Professional (G0280) **\$155**

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- Norton Utilities™
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### Norton SystemWorks™ 2003 Professional



Provides advanced problem-solving solutions to maximise PC performance, includes full version of Norton Ghost™

**2003 Includes:**

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- Norton CleanSweep™
- GoBack Personal Edition

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Personal Edition (G0282) **\$79**

### Norton pcAnywhere™ V11.0



Combines secure, industry-leading remote control\* with remote management and advanced file transfer to help IT personnel quickly resolve helpdesk and server support problems.

\*Source: 2002 IDC Worldwide Remote Control/Remote Access Software Product by Vendor by Market Share report

V11.0 / 5 User (J8957) **\$565**

### Norton Ghost™ 2003



Protects your data from computer disasters. The intuitive Windows® interface makes it easy to create regular backups of your hard drive. You don't even need to make a boot disk. File restoration is simple from the comprehensive disk image.

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5 User (G1149) **\$385**

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Windows Single User (F9859) **\$89**

5 User (G2239) **\$259**

Single User Mac (J5438) **\$105**



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FileMaker Pro 6 enables you to easily organise and track people, projects, images and information. Workgroups can quickly share content over a cross-platform network or their intranet via a web browser. New to version 6 is support for XML, extending the reach of FileMaker Pro to a virtually limitless number of other applications. Also includes 21 new and updated templates for instant productivity.

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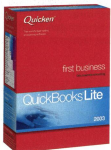
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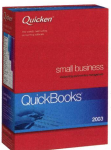
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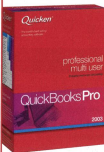
#### QuickBooks 2003 Small Business



- Easier to track the GST
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## Microsoft Windows Server



Windows Server 2003

### Windows Server 2003, Standard Edition

Windows Server 2003, Standard Edition is the network operating system for small organisations and departmental use. It delivers intelligent file and printer sharing, secure Internet connectivity, centralised desktop application deployment, and Web solutions that connect employees, partners, and customers.

Windows Server Standard Edition 2003 5 Client

(I0357) **\$1,999**

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Windows Server Enterprise Edition 2003 25 Client

(I0360) **\$8,039**

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Word 2002					
Excel 2002					
Outlook 2002					
PowerPoint 2002					
Access 2002					
Publisher 2002					
FrontPage 2002					
Developer Tools					
Part Number	(C2082)	(C2084)	(C2772)		
Full Version	<b>\$920</b>	<b>\$1,099</b>	<b>\$1,515</b>		
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Upgrade	<b>\$450</b>	<b>\$649</b>	<b>\$1,049</b>		
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(K0896) **\$79**

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Digital Image Suite including Digital Image Pro and Digital Image Library offers one integrated complete solution for all of your digital imaging needs. Digital Image Suite is packed with all of the tools you need to organise your photos, edit them using hundreds of easy-to-use tools, create hundreds of one-of-a-kind projects, print and share your work, and archive photos for safekeeping.

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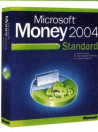


Encarta Premium Suite 2004 combines the resources of its award-winning encyclopedia with a variety of research and learning tools to deliver a complete reference resource for home or school use. New to 2004 is a collection of videos from Discovery Channel and a new Visual Browser.

Available 10<sup>th</sup> September 2003

CD (K0895) **\$149** DVD (K0894) **\$149**

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Academic\*\* (J0848) **\$119**



#### Visual C# .Net 2003

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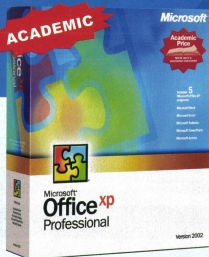
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Academic Edition

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**\$309** SPAD237**\$345** SPAD238**\$495** SPAD239

## PERFORMANCE GAMING

Processor, Motherboard, Graphics, Casing

### AMD

Gigabyte GA-7VA Motherboard

- 3 x DDR400
- 1 x AGP(8x), 5 x PCI, 6 x USB 2.0
- Integrated 6-Channel Audio

Winfast A340TD

• nVIDIA GeForce FX5200

• 128MB DDR RAM

• TV-Out + DVI

AMD Athlon XP 2400

AMD Athlon XP 2800

AMD Athlon XP 3000

**\$475** SPAD257**\$645** SPAD258**\$695** SPAD270

### INTEL

Gigabyte GA-BIPE1000 Motherboard

- 4 x DDR400
- 1 x AGP(8x), 5 x PCI, 6 x USB 2.0
- 2 Serial ATA
- Integrated 6-Channel Audio

Winfast A340TD

• nVIDIA GeForce FX5200

• 128MB DDR RAM

• TV-Out + DVI

Intel Pentium 4 2.6Ghz FS8800

Intel Pentium 4 2.8Ghz FS8800

Intel Pentium 4 3.0Ghz FS8800

**\$775** SPAD261**\$925** SPAD262**\$1199** SPAD263

## Adelong Special

The Adelong Special featuring the Intel Celeron 2.0Ghz Processor is an excellent blend of power and performance at an incredibly low price! Suitable for first time buyers or as a simple replacement PC.

With REDhat Linux Powerbook

**\$799**

With MS Windows XP Home

**\$899**

\*Picture for illustration purposes only

**\$749**

Intel Celeron™ 2.0Ghz  
256MB DDR  
40GB Hard Drive  
1.44MB Floppy Drive  
Integrated Video Accelerator  
52X CDROM  
17" Monitor  
ATX MidTower Case  
Integrated Ethernet  
Integrated Sound  
Keyboard, Mouse, Speakers

## Slimline Advantage

'Super Slimline bookshelf sized case'

**\$1299**

\*Picture for illustration purposes only

AMD Athlon™ XP 2400  
256MB DDR  
40GB Hard Drive  
1.44MB Floppy Drive  
Integrated Video Accelerator  
52X CDROM  
15" LCD Monitor  
Mini Slim Case  
Integrated Ethernet  
Integrated Sound  
Newman Black Keyboard/Mouse  
Windows XP Home

## MSI Mega PC

'Hi-Fi Audio + Performance PC + HomeTheater'

Intel Celeron 2.0Ghz

**\$1299**

Intel Pentium 4 2.4Ghz

**\$1499**

Intel Pentium 4 2.8Ghz

**\$1699**

SPMS1800

SPMS1801

SPMS1802



Front Panel LCM Display  
256MB DDR RAM  
40GB HDD  
16X DVD-ROM  
Integrated Video/6 Channel Audio  
Optical SPDIF-In/Out  
Integrated 56K Modem, 10/100 LAN  
6-in-1 Flash Card Reader  
Mini Keyboard & Optical Mouse  
Altec Lansing AV3300 Speakers  
202(W) x 320(D) x 151(H) mm  
Remote Control Included  
Windows XP Home Edition

### Choose your display:

17" CRT **\$199**17" CRT Flat **\$225**15" LCD **\$455**17" LCD **\$725**

'LANparty Handle for easy relocation of PC'

Intel Celeron 2.0Ghz

**\$1199**

Intel Pentium 4 2.4Ghz

**\$1299**

Intel Pentium 4 2.8Ghz

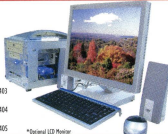
**\$1499**

SPMD403

SPMD404

SPMD405

## E-Cube PC



\*Optional LCD Monitor

Dual Side Windows  
256MB DDR RAM  
40GB HDD  
1.44MB Floppy Drive  
16X DVD-ROM  
Integrated Video Accelerator  
Integrated 10/100 LAN  
Integrated 6 Channel Audio  
Mini Keyboard, Optical Mouse, Speakers  
211(W) x 305(D) x 242(H) mm  
Windows XP Home Edition

## Mini Keyboard

- Super slim & mini-body design, save your working room
- Professional design appearance
- 89 key Internet & Multimedia keyboard
- USB Interface

**\$35** IOGBN19

## USB Wireless

These adaptors plug straight into your USB port to give you instant wireless access to PDAs, PCs and Mobiles phones.

USB Bluetooth Adaptor

**\$75** HADB356

USB Infrared IrDA Adaptor

**\$75** HADB357

## Call Centre

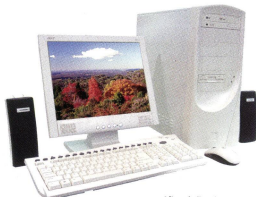
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Saturday 10am - 4pm

# SALES HOTLINE: 02 9260 3190

Fax: 02 9267 5042 | Email: [sales@adelong.com.au](mailto:sales@adelong.com.au)

### SOHO Advantage

- 256MB DDR RAM
- 40GB HDD
- 1.44MB Floppy Drive
- Integrated Video Accelerator
- 17" CRT Monitor
- 52X CDROM
- ATX MidTower Case
- Integrated Ethernet
- Integrated Sound
- Keyboard, Mouse, Speaker
- MS Windows XP Home Edition



\* Picture for illustration purposes only

AMD Athlon™ XP 2000	<b>\$899</b>	SYADE325
AMD Athlon™ XP 2200	<b>\$945</b>	SYADE326
AMD Athlon™ XP 2400	<b>\$999</b>	SYADE327
Intel Celeron™ 2.0Ghz	<b>\$899</b>	SYADE328
Intel Celeron™ 2.2Ghz	<b>\$975</b>	SYADE329
Intel Pentium™ 4 2.4Ghz	<b>\$1099</b>	SYADE330

### Power Advantage

- 512MB DDR RAM
- 40GB HDD
- 1.44MB Floppy Drive
- 64MB GeForce4 MX440SE with TV Out
- 17" CRT Monitor
- 52X CD-ROM
- ATX MidTower Case
- Integrated 6-Channel Sound
- Keyboard, Mouse, Speakers
- MS Windows XP Home Edition

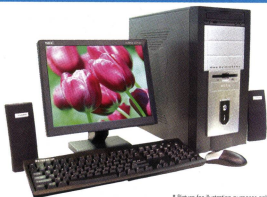


\* Picture for illustration purposes only

AMD Athlon™ XP 2400	<b>\$1035</b>	SYADE331
AMD Athlon™ XP 2600	<b>\$1055</b>	SYADE332
AMD Athlon™ XP 2800	<b>\$1275</b>	SYADE333
Intel Pentium™ 4 2.4Ghz	<b>\$1175</b>	SYADE334
Intel Pentium™ 4 2.67Ghz	<b>\$1255</b>	SYADE335
Intel Pentium™ 4 3.06Ghz	<b>\$1655</b>	SYADE336

### Gamer Advantage

- 512MB DDR RAM
- 40GB HDD
- 1.44MB Floppy Drive
- 128MB ATI Radeon 9200
- 17" CRT Monitor
- 16X DVD-ROM
- ATX MidTower Case
- Integrated 6-Channel Sound
- Altec Lansing AVS300 Speakers
- PS/2 Multimedia Keyboard
- USB Optical Mouse
- MS Windows XP Home Edition



\* Picture for illustration purposes only

AMD Athlon™ XP 2400	<b>\$1395</b>	SYADE337
AMD Athlon™ XP 2700	<b>\$1475</b>	SYADE338
AMD Athlon™ XP 2800	<b>\$1595</b>	SYADE339
Intel Pentium™ 4 2.4Ghz FSB800	<b>\$1595</b>	SYADE340
Intel Pentium™ 4 2.6Ghz FSB800	<b>\$1695</b>	SYADE341
Intel Pentium™ 4 2.8Ghz FSB800	<b>\$1799</b>	SYADE342

### UPGRADES FOR SOHO, POWER & GAMER SYSTEMS

Upgrade to 512MB DDR RAM	<b>\$65</b>	Upgrade to 15" LCD Monitor	<b>\$355</b>	Upgrade to Multimedia KB & Optical Mouse	<b>\$35</b>
Upgrade to 80GB HDD	<b>\$45</b>	Upgrade to 17" LCD Monitor	<b>\$595</b>	Add 10/100 PCI Ethernet Adapter	<b>\$15</b>
Upgrade to 120GB HDD	<b>\$89</b>	Upgrade to 19" CRT Monitor	<b>\$175</b>	Add 52x24x52 CD/RW	<b>\$69</b>
Upgrade to 16X DVD-ROM	<b>\$35</b>	Add Internal 56K PCI Modem	<b>\$25</b>	Add 2xDVD-R/1xDVD-RW	<b>\$329</b>

### OEM Software Options on all Systems

Upgrade to MS Windows XP Professional	<b>\$125</b>	Add MS Office XP SBE	<b>\$355</b>	Add MS Office XP Professional	<b>\$475</b>	Add Norton Anti-Virus 2003	<b>\$39</b>
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Saturday 10am - 4pm

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for ONLY \$5.50 per month**

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- ☒ **Unlimited download**
- ☒ **FREE e-mail account**
- ☒ **FREE Personal web space**

PLAN	Monthly Access Fee	Included Hours Per Month	Excess Usage Charge
Light	\$5.50	10 hours	55¢ per hour
Quarterly	\$22.00	Unlimited	NIL

\* Light Plan: \$10.00 deposit, the extra hours must be paid at the next period or within 7 days after the period finished  
\* Quarterly Plan: No deposit required, charged quarterly in advance, total charge \$66.00

**INTERNET CONNECTION HERE**

Technical Support and Enquiry Phone: 02 9262 7722 | National: 1 300 881 100 | 127 York St Sydney 2000

\*\* All Net reserves the right to vary the Pricing Schedule at any time without notices. \* conditions apply.

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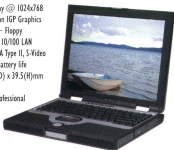


## Compaq Notebooks

### EVO N1015V

The Compaq EVO N1015V is an affordable notebook without compromising on performance or features.

- AMD Athlon XP 1800+
- 256MB DDR RAM up to 1GB
- 30GB HDD
- 14.1" TFT Display @ 1024x768
- 16MB ATI Radeon IGP Graphics
- 8X DVD-ROM + Floppy
- 56K Modem + 10/100 LAN
- 2 x USB, PCMCIA Type II, S-Video
- Up to 3 hours battery life
- 327(W) x 267(D) x 39.5(H)mm
- Weighs 3kg
- Windows XP Professional



**\$1795** NBCE0095

### EVO N1020V

Simplicity and performance at exceptional value.

- Intel Pentium 4 2.4GHz
- 256MB DDR RAM up to 1GB
- 40GB HDD
- 15" TFT Display @ 1024x768
- 32MB ATI Radeon IGP 340M Graphics
- 24x10x24 + 8 CD/RW/DVD + Floppy
- 56K Modem + 10/100 LAN
- 2 x USB, IEEE1394 FireWire, iR, PCMCIA Type II, S-Video
- Up to 3 hours battery life
- 327(W) x 267(D) x 39.5(H)mm
- Weighs 3kg
- Windows XP Professional



**\$2795** NBCE0099

P4-M 1.8GHz/14" TFT  
**\$2595** NBCE0096

### Tablet PC TC1000

Versatile enough to adapt to your working style with all with the power and productivity of a Windows PC.

- Transmeta Crusoe 5800 1GHz
- 256MB PC133 SDRAM up to 768MB
- 30GB HDD
- 10.4" TFT with 180° rotation
- Tablet PC Pen
- 16MB iVGA GeForce2 Go Graphics
- 56K Modem, 10/100 LAN, 802.11b Wi-Fi LAN
- 2 x USB 2.0, PCMCIA Type II, CompactFlash
- Over 5 hours battery life
- 274(W) x 216(D) x 20(H)mm
- Weighs 1.8kg with keyboard
- Windows XP Tablet PC Edition



**\$3295** NBCE0101

## Acer Notebooks

### TravelMate 234X

Plenty of performance with outstanding connectivity, wrapping essential computing tools into one convenient package.

- Intel Celeron 4.2GHz
- 128MB DDR RAM up to 1GB
- 20GB HDD
- 14.1" TFT Display @ 1024x768
- Integrated VGA with DMT Technology
- 24X CD-ROM + Floppy
- 56K Modem, 10/100 LAN
- 2 x USB 2.0, PCMCIA Type II/III
- Up to 2.5 hours battery life
- 326(W) x 267(D) x 35-37.3(H)mm
- Weighs 3kg



Windows XP Home  
**\$1795** NBACE042

Windows XP Professional  
**\$1995**

Bonus TravelSlim Polyester Case

### TravelMate 284XC

Specially designed for high-intensity work, helping you to handle the assortment of demanding projects you face, with speed and efficiency.

- Intel Pentium 4-M 2.2GHz
- 256MB DDR RAM up to 1GB
- 30GB HDD
- 14.1" TFT Display @ 1024x768
- 64MB VRAM Intel DMTX Graphics
- 24x10x24 + 8 CD/RW/DVD + Floppy
- 56K Modem + 10/100 LAN
- 2 x USB 2.0, PCMCIA Type II/III
- Up to 2.5 hours battery life
- 326(W) x 267(D) x 35-37.3(H)mm
- Weighs 3kg



Windows XP Home  
**\$2595** NBACE041

Windows XP Professional  
**\$2795**

Bonus TravelSlim Polyester Case

### Aspire 1703SC

Desktop power and flexibility combined with all-in-one style, convenience and portability.

- Intel Pentium 4 2.46GHz
- 256MB DDR RAM up to 2GB
- 80GB HDD
- 17" TFT Display @ 1280x1024
- 64MB iVGA560 Graphics
- 24x10x24 + 8 CD/RW/DVD + Floppy
- 56K Modem + 10/100 LAN
- 4 x USB 2.0, 2 x IEEE1394
- FireWire, PCMCIA Type II, S-Video
- Up to 1.5 hours battery life
- 378(W) x 320(D) x 47-55(H)mm
- Weighs 7.1kg with battery
- Windows XP Home



**\$2795** NBACE043

Integrated Subwoofer

## Toshiba Notebooks

### Satellite I130

Exceptional features and functionality packed into an affordable price, the Satellite I130 is perfect for small business or home office users.

- Intel Mobile Celeron 1.8GHz
- 256MB DDR RAM up to 1GB
- 30GB HDD
- 14.1" TFT Display @ 1024x768
- 16MB Intel 852GM Graphics
- 8X DVD-ROM
- Integrated Wi-Fi Antenna
- 56K Modem + 10/100 LAN
- 3 x USB 2.0, PCMCIA Type II/III, S-Video
- Up to 3 hours battery life
- 330(W) x 279(D) x 43(H)mm
- Weighs 2.8kg
- Windows XP Professional

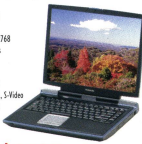


**\$1895** NBTD0125

### Satellite A10

The Satellite A10's versatility and user-friendliness packs a punch only exceeded by its outstanding performance and processing power.

- Intel Pentium M 1.4GHz
- 256MB DDR RAM up to 1GB
- 40GB HDD
- 14.1" TFT Display @ 1024x768
- 64MB Intel 852GM Graphics
- 24x10x24 + 8 CD/RW/DVD
- Integrated Wi-Fi Antenna
- 56K Modem + 10/100 LAN
- 2 x USB 2.0, PCMCIA Type II, S-Video
- Up to 2.8 hours battery life
- 332(W) x 293(D) x 33-46(H)mm
- Weighs 2.8kg
- Windows XP Professional



Cel 2.0GHz/30GB  
**\$2075** NBTD0127

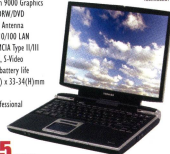
**\$2495** NBTD0126

15" TFT/60GB  
**\$2999** NBTD0128

### Tecra S1

The Toshiba Tecra S1 with Intel Centrino technology is the perfect notebook PC for organisations ready to implement wireless networking into the workplace.

- Intel Pentium M 1.4GHz
- 256MB DDR RAM up to 2GB
- 40GB HDD
- 15" TFT Display @ 1024x768
- 32MB ATI Radeon 9000 Graphics
- 24x10x24 + 8 CD/RW/DVD
- Integrated Wi-Fi Antenna
- 56K Modem + 10/100 LAN
- 3 x USB 2.0, PCMCIA Type II/III
- iR, SecureDigital, S-Video
- Up to 3.4 hours battery life
- 327(W) x 287(D) x 33-34(H)mm
- Weighs 2.8kg
- Windows XP Professional



**\$3495** NBTD0120





## Hard Drives

### Western Digital

#### Caviar

• Ultra ATA/100	40GB	<b>\$115</b>	HDWES080
• 9ms Avg. Seek time	60GB	<b>\$135</b>	HDWES081
• 5400RPM	80GB	<b>\$155</b>	HDWES082
• 2MB Cache Buffer	100GB	<b>\$185</b>	HDWES082
	120GB	<b>\$195</b>	HDWES083
• Ultra ATA/100	40GB	<b>\$125</b>	HDWES015
• 8.9ms Avg. Seek time	60GB	<b>\$145</b>	HDWES017
• 5400RPM	80GB	<b>\$165</b>	HDWES019
• 2MB Cache Buffer	120GB	<b>\$199</b>	HDWES023
	200GB	<b>\$375</b>	HDWES027



#### Raptor - SATA

• Serial-ATA (ATA 150)	36.7GB	
• 5.2ms Avg. Seek time	<b>\$325</b>	HDWES1004
• 10000RPM		
• 8MB Cache Buffer		

### Seagate

#### Barracuda

• Ultra ATA/100	40GB	<b>\$125</b>	HDSTG0357
• 8.5ms Avg. Seek time	80GB	<b>\$165</b>	HDSTG0468
• 7200 RPM	120GB	<b>\$195</b>	HDSTG0609
• 2MB Cache Buffer	160GB	<b>\$315</b>	HDSTG0706

#### Barracuda - SATA

• Serial-ATA (ATA 150)	80GB	<b>\$245</b>	HDSTG0975
• 8.5ms Avg. Seek time	120GB	<b>\$275</b>	HDSTG0704
• 7200 RPM	160GB	<b>\$325</b>	HDSTG0707
• 8MB Cache Buffer			

### Maxtor

#### DiamondMax

• Ultra ATA/133	80GB	<b>\$165</b>	HDMA8032
• 9ms Avg. Seek time	120GB	<b>\$195</b>	HDMA8032
• 7200 RPM	160GB	<b>\$315</b>	HDMA8033
• 2MB Cache Buffer	200GB	<b>\$375</b>	HDMA8034

#### Atlas IV

• Ultra320 SCSI	36.7GB	<b>\$345</b>	HDMA8040
• 4.3ms Avg. Seek time	73.4GB	<b>\$795</b>	HDMA8041
• 10000 RPM	146GB	<b>\$1495</b>	HDMA8042
• 8MB Cache Buffer			

### 5.25" Mobile Rack

- ATA-100 IDE Interface
- Remountable with ATA-100/66/33 Hard Drives
- Rear Mounted Cooling Fan



**\$25**

MSAD0000

### 5.25" Sky Case

- For standard 5.25" CD-ROM or CD-RW
- Ice white body & blue front bezel and foot pad
- 4cm cooling fan
- Includes power cable
- PC & Mac compatible



USB 2.0 **\$125**  
FireWire **\$135**

HDCEI010  
HDCEI011

### Notebook Hard Drive

• 9mm 2.5" Hard Drive	20GB	<b>\$175</b>	HDH07008
• ATA-100 IDE Interface	30GB	<b>\$215</b>	HDH07010
• 4200 RPM	40GB	<b>\$255</b>	HDH07011
• Compatible with most Notebooks	60GB	<b>\$345</b>	HDH07012

### 3.5" External Hard Drive

- Integrated power supply
- 2.5cm cooling fan
- Includes power cable & foot stand
- PC & Mac compatible
- (W)162 x (L)208 x (H)36mm
- Weighs 1.5kg including cables

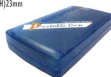


	USB 2*	FireWire
Case w/HD	<b>\$115</b>	<b>\$115</b>
40GB	<b>\$235</b>	<b>\$235</b>
60GB	<b>\$255</b>	<b>\$255</b>
80GB	<b>\$275</b>	<b>\$275</b>
120GB	<b>\$325</b>	<b>\$325</b>
160GB	<b>\$395</b>	<b>\$395</b>

\*USB 2 Hard Drives are backwards compatible with USB 1.1 ports, however, transfer rates will be limited to USB 1.1 specifications.

### 2.5" External Hard Drive

- Rotating Access LED
- Bus-powered, no power adapters required
- PC & Mac compatible
- (W)79 x (L)143 x (H)23mm



	USB 2*	FireWire
Case w/HD	<b>\$55</b>	<b>\$55</b>
20GB	<b>\$235</b>	<b>\$235</b>
30GB	<b>\$275</b>	<b>\$275</b>
40GB	<b>\$295</b>	<b>\$295</b>
60GB	<b>\$375</b>	<b>\$375</b>

\*USB 2 Hard Drives are backwards compatible with USB 1.1 ports, however, transfer rates will be limited to USB 1.1 specifications.

## Expansion

### PCI to USB 2.0

Connect your USB 2.0 devices to this easy to install PCI adapter. 100% backward compatible with all USB devices.



2-Port **\$35**  
4-Port **\$45**

CCGEN043  
MSK0002

### PCI to FireWire

Connect your IEEE 1394 FireWire devices to this easy to install PCI adapter.



2 x FireWire +  
2 x USB2.0 Ports **\$35**  
2 x FireWire **\$95**

CCGEN039  
CCGEN041

### FireWire/USB PC Cards



Connect FireWire/USB devices through this CardBus PCMCIA adapter.

3-Port USB 2.0 **\$75**  
2-Port FireWire **\$85**  
2 USB & 3 FireWire Combo **\$145**

CCGEN049  
CCGEN050

### I/O Expansion Card



PCI Printer Card **\$39**  
Dual PCI Printer Card **\$45**  
PCI 1 x Serial Port Card **\$49**  
PCI 2 x Serial Port Card **\$55**

CCGEN032  
CCGEN037  
CCGEN036  
CCGEN039

### Tekram DC-315U Ultra SCSI Card

- Transfer rate up to 20MB/s
- Support up to 7 devices
- SCSI Rends 50 Interface
- PCI Interface



**\$45**

CCGEN019

### External USB Floppy

- USB 1.1 interface
- Compact & portable design
- Hot Plug->Play
- USB Bus-powered, no power adapters required



**\$89**  
Internal 3.5" Floppy Drive **\$20**

FDGEN000  
FDPA0000

### External 4-Port USB 2.0 Hub

- Plug->Play capabilities for external peripherals
- Auto shut down when the PC is off
- Auto switch power source to bus power or self power



**\$55**

MSK0001

### External 3-Port FireWire Hub

- FireWire bus-powered, no power adapter required
- Plug->Play capabilities for external peripherals
- PC & Mac compatible



**\$55**

SDADE000

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## KVM Switches

**Control multiple computers with a single monitor, keyboard & mouse!**



- Create more working space and cut down on cost
- Hotkey or push button for PC selection
- Supports VGA & VGA resolution up to 1600x1200 (2-port) & 1920x1440 (4-port)
- Supports P/S2 mouse & keyboard
- Supports all operating systems
- Cables included

2-Port **\$95** DSADE39  
 4-Port **\$175** DSADE40

## Netcomm Modems

### ADSL USB Modem

Now you can enjoy the Internet, email and remote access at speeds up to 100 times faster than 56K modems. Designed with a Plug-&Play bus-powered USB interface to ease setup and use. A microfilter is included to prevent interference with your telephone line.

**\$159** NWNET030



ADSL USB Modem/Router **\$179** NWNET031

### Rave USB Modem

A full duplex V.90 56K data/voice modem, Internet access at a low cost. The Netcomm Rave USB modem lets you jump online at full speed. And because it's USB, you just Plug and Play and you're away!

**\$89** TNNET024



### InModem 56 V.92

Delivers high-speed voice, data and fax transmission in an easy-to-install and trouble free PCI format. Internal modems are a simple to use, with nothing to connect except the RJ11 phone connection.



**\$35** NWNET033

## Networking

### 10/100 PCI Network Adapter

10/100 PCI network adapter is an efficient, affordable, full-featured desktop resource. Auto-configurable upon power-up, it supports 32-bit data transfer mode. It features Wake-On LAN, enabling network management from remote locations.

**\$15** NWNET021

### 10/100 USB Network Adapter

10/100 USB network adapter attaches to the desktop or mobile PC via the USB Port. No external power is needed and no further configuration is required once the USB adapter is automatically recognized.

**\$75** DSADE43



### 10/100 PC Card

Connect your notebook computer to a 10BaseT or 100BaseTX network in just minutes. The 10/100 PC (PCMCIA) Card will allow you to share files, printers, Internet connections and more.



**\$75** NWNET018

### USB Laplink Data Cable

This USB Laplink cable allows you to transfer files between two computers equipped with USB ports without messy configurations.



**\$55** MSADE050

## Cases

### Adelong M71 ATX

- 4 x External 5.25" Bays
- 1 x External 3.5" Bays
- Front USB
- W: 200mm
- D: 491mm
- H: 422mm
- Power Supply: 300W ATX



Grey **\$79** CADE092

Black **\$79** CADE094

### Adelong Mini Server

- Drive Bays:
  - 8 x 5.25" (1 Internal)
  - 5 x 3.5" (4 Internal)
- 2 Additional cooling fans
- W: 224mm
- H: 436mm
- D: 500mm
- Power Supply: 400W ATX



**\$149** CADE035

### Adelong CS100 uATX Slim

- 1 x External 5.25" Bays
- 1 x External 3.5" Bays
- 1 x Internal 3.5" Bays
- 2 x Internal 2.5" Bays
- Front USB & Audio
- W: 133mm
- D: 384mm
- H: 355mm
- Power Supply: 300W ATX



Black **\$89** CADE028

Silver **\$89** CADE029

### Power Supplies



300W P4 ATX POWER SUPPLY **\$45** PSEGEN03

350W P4 ATX POWER SUPPLY **\$49** PSEGEN01

400W P4 ATX POWER SUPPLY **\$55** PSEGEN05

### Tsunami Capricorn CS-42

- 4 x External 5.25" Bays
- 2 x External 3.5" Bays
- Front USB
- W: 234mm
- D: 488mm
- H: 531mm
- Power Supply: 400W ATX



Blue **\$79** CADE022

Black **\$79** CADE023

### Tsunami Sagittarius ST-53

- Side window
- 5 x External 5.25" Bays
- 1 x External 3.5" Bays
- 2 x Internal 3.5" Bays
- Front USB & Audio
- In/Out
  - W: 200mm
  - D: 425mm
  - H: 340mm
- Power Supply: 400W ATX



Black **\$99** CADE018

Silver **\$99** CADE019

### Cube Case

- Built-in iAcryp 4845GV motherboard (Intel 845GV Chipset, 533MHz, 4-Channel Audio, 4X AGP, USB2.0)
- Aluminium Case Body
- Acrylic surface on face panel
- 2 x External 5.25" Bays
- 1 x External 3.5" Bays
- 1 x Internal 3.5" Bays
- 2 x Expansion Slots
- W: 225mm
- D: 330mm
- H: 200mm
- Power supply: 300W ATX



Dark Blue **\$175** CADE026

Silver **\$175** CADE027

### Chieftek DX-01

- 3 x External 5.25" Bays
- 2 x External 3.5" Bays
- 2 x Internal 3.5" Bays
- Front USB & IEEE1394
- FireWire
- Screw-less PCI Card Clipper
- Thumb screws for FDD & HDD installation
- W: 180mm
- D: 440mm
- H: 460mm
- Power Supply not included



**\$155** CACH000

**SALES HOTLINE: 02 9260 3190**

Fax: 02 9267 5042 | Email: [sales@adelong.com.au](mailto:sales@adelong.com.au)

## Gigabyte Motherboards

### GA-8SIMLH

- For Intel P4 with HT Technology
- 533/400 FSB Support
- SiS 651 Chipset
- 2 x DDR333/266 up to 2GB
- Onboard Graphics
- Onboard 2-Channel Audio
- Onboard 10/100 LAN
- 1 x AGP(8X), 5 x PCI, 2 x USB2.0
- 4 x front/rear USB option
- Micro ATX Form



**\$135**

MBGIG073

### GA-8S648FX

- For Intel P4 with HT Technology
- 800/533/400 FSB Support
- SiS 648FX Chipset
- 3 x DDR266 to 3GB, DDR400/333 to 2GB
- 6-Channel Audio with SP/DIF
- Optional 3 Port IEEE1394 Daughter card
- ATX Form



**\$155**

MBGIG08

### GA-8IPE1000

- For Intel P4 with HT Technology
- 800/533/400 FSB Support
- Intel 865PE Chipset
- Dual Channel 4 x DDR400/333/266 up to 4GB
- 6-Channel Audio with SP/DIF
- 1 x AGP(8X), 5 x PCI, 2 x USB2.0
- 4 x front/rear USB option
- ATX Form



**\$199**

MBGIG183

### GA-8IPE1000 Pro

- Intel 10/100 LAN
- 2 x 1394 Firewire

**\$245**

MBGIG184

### GA-7VA

- For AMD Socket A
- 333/266/200 FSB Support
- VIA KT400 Chipset
- 3 x DDR400/333 up to 3GB
- Onboard 6-Channel Audio with SP/DIF function
- Onboard 10/100 LAN
- 1 x AGP(8X), 5 x PCI, 2 x USB2.0
- 4 x front/rear USB option
- ATX Form



**\$125**

MBGIG078

### GA-7N400-LI

- For AMD Socket A
- 400/333/266 FSB Support
- NVIDIA Ultra400 + MCP-T
- Outstanding Graphics and Memory Support
- Dual Channel 4 x DDR400/333/266 up to 3GB
- Onboard 6-Channel Audio with SP/DIF function
- 1 x AGP(8X), 5 x PCI, 2 x USB2.0
- Integrated 10/100 Ethernet
- ATX Form



**\$149**

MBGIG113

GA-700 PRO **\$199**

MBGIG112

GA-7NXP **\$299**

MBGIG111

### GA-7VT600F

- For AMD Socket A
- 400/333/266/200 FSB Support
- VIA KT600 Chipset
- Dual Bios Support
- 3x DDR400/333/266 up to 3GB
- Onboard 6-Channel Audio
- Serial ATA Support
- 1 x AGP(8X/4X), 5 x PCI, 4 x USB2.0
- 2 x IEEE 1394, Integrated 10/100 Ethernet
- ATX Form



**\$155**

MBGIG114

**VIA KT600 Chipset**

## MSI Motherboards

### MS-6533XG-L

- For Intel P4 with HT Technology
- 533/400 FSB Support
- SiS 651 Chipset
- 2 x DDR333/266/200 up to 2GB
- Onboard Graphics
- Onboard 6-Channel Audio
- Onboard 10/100 LAN
- 1 x AGP(8X), 5 x PCI, 1 x CNR, 2 x USB2.0, 4 x front/rear USB option
- Micro ATX Form



**\$135**

MBMS033

### 865GM2-LS

- For Intel P4 with HT Technology
- 800/533/400 FSB Support
- Intel 865G Chipset
- Intel Extreme Graphics Engine 2
- 2 x DDR400/333/266 up to 2GB
- Onboard 6-Channel Audio; optional SP/DIF bracket
- Serial ATA /150 for up to 150Mb/s speed
- 1 x AGP(8X), 3 x PCI, 8 x USB2.0 (front/rear), Intel 10/100 Network
- ATX Form



**\$199**

MBMS046

**Performance All-in-One**

### K7N2G-L

- For AMD Socket A
- 333/266/200 FSB Support
- nVIDIA nforce2 1GP Chipset
- 3 x DDR400/333/266 up to 3GB
- Onboard GeForce MX Graphics
- Onboard 6-Channel Audio
- Onboard 10/100 LAN
- Onboard TV-Out Encoder
- 1 x AGP(8X), 5 x PCI, 1 x AC97, 2 x USB2.0
- 4 x front/rear USB option
- ATX Form



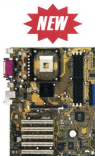
**\$175**

MBMS038

## ASUS Motherboards

### P4S800

- For Intel P4 with HT Technology
- 800/533/400 FSB Support
- SiS648FX Chipset
- Dual Channel 3 x DDR400/333/266 up to 3GB
- S.I Audio with SP/DIF on back I/O
- Supports ASUS Instant Music Lite
- 1 x AGP(8X), 5 x PCI, 4 x USB2.0
- Integrated 10/100 Ethernet
- ATX Form



**\$195**

MBAS038

### P4P8X

- For Intel P4 with HT Technology
- 800/533/400 FSB Support
- Intel 865P MCH Chipset
- Dual Channel 4 x DDR400/333/266 up to 4GB
- Intelligent 6-Channel Audio notifies users of inappropriate connections
- Serial ATA Support
- 1 x AGP(8X), 5 x PCI, 4 x USB2.0
- 3COM 1000Mbps (1GB) Ethernet
- ATX Form



**\$235**

MBAS037

**Intelligent Audio**

### A7V600

- For AMD Socket A
- 400/333/266/200 FSB Support
- VIA KT600 Chipset
- Dual Channel 4 x DDR400/333/266 up to 3GB
- Onboard 6-Channel Audio with SP/DIF function
- Serial ATA Support
- 1 x AGP(8X), 6 x PCI, 8 x USB2.0 (4 Int/ 4 Ext)
- 3COM 1000Mbps (1GB) Ethernet
- ATX Form



**\$199**

MBAS039

**Come visit our store at**  
**127 York Street, SYDNEY NSW 2000**

## Graphics / TV

### GeForce4 MX440SE

- nVIDIA GeForce MX440SE
- 64MB DDR RAM
- Supports AGP 4X/2X
- Memory bandwidth up to 8.8GB/sec
- Up to 2048 x 1536 @75Hz
- TV-Out

**GREAT VALUE**



**\$89** DCGEN03

### LeadTek WinFast TV2000 XP Deluxe

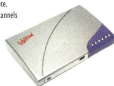
- WinFast TV2000 XP is the smartest and most effective way of turning your PC into a high definition TV entertainment center.
- TV/Video/TV PCI Capture Card
- Watch high-quality TV with dual stereo in full screen or a scalable window
- NTSC, PAL or SECAM
- S-Video & I x RCA Input
- 3.5mm Stereo Jack for Audio In/Out
- Remote Included



**\$125** MML001

### LifeView FlyTV Box

- The FlyTV Box is a true standalone TV box with no software and driver required. You can watch TV, video, or play TV games on any LCD or CRT monitor up to 1024x768 resolution. Comes with Remote.
- Auto scan TV frequency up to 125 channels
- Composite Video & S-Video input
- 3.5mm Stereo Jack for Audio Input/Output



**\$255** MME055

## Gigabyte Graphics

### MAYA II Radeon 9200

- 128-bit ATI Radeon 9200
- 64MB DDR RAM
- Supports AGP 8X/4X
- Four parallel rendering pipelines process up to 1.2 billion pixels per second
- DVI/TV-Out
- Alternative Video mode supports Video-in



128MB **\$175** DCGIG011

128MB VIVO **\$199** DCGIG012

**\$145** DCGIG010

### MAYA II Radeon 9500

- 128-bit ATI Radeon 9500
- 64MB DDR RAM
- Supports AGP 8X/4X
- Pixel shaders used to accelerate video
- Gigabyte V-Tuner allows overclocking of your VPU and Memory
- DVI/TV-Out



Radeon 9600 PRO 128MB

**\$395** DCGIG014

**\$299** DCGIG006

### MAYA II Radeon 9800 PRO

- 256-bit ATI Radeon 9800 PRO
- 128MB DDR RAM
- Supports AGP 8X
- 8-pixel pipeline architecture
- Gigabyte V-Tuner allows overclocking of your VPU and Memory
- DVI/TV-Out



9800 PRO 256MB

**\$945** DCGIG015

**\$799** DCGIG013

## LeadTek Graphics

### A310 TD MyVIVO

- nVIDIA GeForce FX 5600
- 128MB DDR RAM
- Supports AGP 8X
- 8.8 GB/sec memory bandwidth
- 1.3 Billion AA samples/sec fill rate
- 81 Million vertices/sec
- Video capture from VCR, camcorder, LD/VCD/DVD player
- DVI up to 1600x1200
- TV-Out up to 1024x768



A280 TD Ti 4200 MyVIVO

**\$255** DCL0010

**\$325** DCL0037

### A340 TD

- nVIDIA GeForce FX 5200 GPU
- 128MB DDR RAM
- Supports AGP 8X
- 350MHz RAMDACs
- 6.4 GB/sec memory bandwidth
- 1 Billion AA samples/sec fill rate
- 63 Million vertices/sec
- DVI up to 1600x1200
- TV-Out up to 1024x768



A180 DDR TDH MX440

**\$155** DCL0029

**\$175** DCL0015

### WinFast A350 Ultra TDH MyVIVO

- nVIDIA GeForce FX 5900 Ultra GPU
- 256MB DDR RAM
- Supports AGP 8X
- 400MHz RAMDACs
- 27.2 GB/sec memory bandwidth
- 3.6 Billion AA samples/sec fill rate
- 338 Million vertices/sec
- DVI up to 1600x1200
- TV-Out up to 1024x768



**\$899** DCL0038

## MSI Graphics / TV Tuner

### TV @nywhere Master

- Invincible video quality supported by Silicon Tuxer & Conexant audio/video decoder
- Global Support inc. NTSC & PAL
- Support Video and Audio Tuning
- Powerful software supports scheduled recording, Screen capture and Parental control
- Includes InterVideo Producer/Codec
- Remote Control & Cables included



**\$135** MMS0004

### FX5200-TD128

- nVIDIA GeForce FX 5200
- 128MB DDRAM
- Supports AGP 8X
- GPU Core Clock 250MHz
- Memory Clock 400MHz
- Fill Rate of 1.3 billion texels/sec & 81 million vertices/sec
- Supports OpenGL and Direct X 9
- TV-Out and DVI Support



**\$175** DCM5004

### Ti4200-TD8X

- nVIDIA GeForce Ti 4200
- nVIDIA nfiniteFX™ II Engine
- 128MB DDRAM
- Supports AGP 8X
- 4.0 billion AA samples/sec fill rate
- 113 million texels/sec
- 1.03 trillion operations/sec
- TV-Out and DVI Support



**\$295** DCM5003

## Creative Sound Cards

### Sound Blaster Audigy 2 Platinum

Sound Blaster Audigy 2 delivers high-quality multi-channel recording and playback at up to 24-bit/96kHz and is the first PC products to offer playback of Advanced Resolution DVD-Audio at an astonishing 24-bit/192kHz with a stunning Signal-to-Noise ratio of 106dB

- Sound Blaster 24-bit audio
- THX®-certified & Dolby digital EX
- 6.1 Surround Sound
- 24-BIT/96 kHz recording
- EAX® advanced HD™ gaming
- Audigy internal drive for firmware, analog digital ports

**\$399** MHC0096

External **\$495** MHC0098



Creative Sound Blaster Vibra 128

**\$39** MHC0043

Creative Sound Blaster Live DE 5.1

**\$79** MHC0072

Creative Audigy 2

**\$79** MHC0097

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## Lite-On Optical Drives

### 52x CD-ROM

- Transfer rate of up to 7,800Kb/s
- E-IDE Interface
- Easy-Install® design for both horizontally & vertically use

**\$39** MM1000

### 16x DVD-ROM

- 16x DVD-Rom/48x CD-Rom Drive
- E-IDE Interface
- Easy-Install® design for both horizontally & vertically use

**\$69** MM1003

### 52x32x52 CD-RW

- Writes CD-R at 52x/CD-RW at 32x
- Reads at up to 52x
- E-IDE Interface

**\$79** MM1012



### 40x24x40 Ext CD-RW

- Writes CD-R at 40x/CD-RW at 24x
- Reads at up to 40x
- Top loading disc and stylish design
- USB 2.0 connection to ensure 40x performance
- USB 1.1 connection reads/writes at 6x/4x
- Weighs 11g
- 152 x 24.3 x 198mm

**\$225** MM1007



### Ext Slim CD-RW/DVD

- Writes CD-R at 24x/CD-RW at 12x
- Reads CD at 24x/DVD at 8x
- Top loading disc and stylish design
- USB 2.0 connection to ensure 24x performance
- USB 1.1 connection reads/writes at 6x/4x
- Weighs 0.42Kg
- 138 x 24.3 x 177mm

**\$345** MM1010



## LG Optical Drives

### 52x CD-ROM

- Transfer rate up to 7,800Kb/sec
- E-IDE Interface
- Mounts Vertically & Horizontally

**\$49** MM1002

### 16x DVD-ROM

- 16x DVD-Rom/48x CD-Rom Drive
- E-IDE Interface
- Mounts Vertically & Horizontally

**\$79** MM1004

### 52x24x52 CD-RW

- Writes CD-R at 52x/CD-RW at 24x
- Reads at up to 52x
- E-IDE Interface
- Mounts Vertically & Horizontally

**\$89** MM1001



### CD-RW/DVD Combo

- Writes CD-R at 48x/CD-RW at 24x
- Reads CD at 48x/DVD at 16x
- E-IDE Interface
- Mounts Vertically & Horizontally

**\$129** MM1003



### DVD-RW

- Record data up to 4.7GB per side on DVD media
- Writes DVD-R at 2x/DVD-RW at 1x
- Writes CD-R at 12x/CD-RW at 8x
- Reads DVD at 10x/CD at 32x
- E-IDE Interface
- Mounts Vertically & Horizontally

**\$345** MM1002



## Panasonic DVD Multidrives

### D521 DVD-RW Kit

- Panasonic SW-9571 IDE DVD-MultiDrive
- 2MB Cache Buffer
- Reads: 12X DVD/32X CDROM
- Writes: 2x DVD-R, 2x DVD-R, 1x DVD-RW, 12x CD-R, 8x CD-RW
- Software Includes: DVD Movie Album for creating DVD movies, MyDVD DVD/CD recording software, WinDVD playback software
- Region Coding software and DVD disk utilities
- Includes DVD-RAM & DVD-R Media
- Includes cables & accessories

**\$429** MPFAM026



### D521 DVD-RW Pinnacle Kit

- Panasonic SW-9571 IDE DVD-MultiDrive
- 2MB Cache Buffer
- Reads: 12X DVD/32X CDROM
- Writes: 2x DVD-RAM, 2x DVD-R, 1x DVD-RW, 12x CD-R, 8x CD-RW
- DV/Firewire interface card included
- Software Includes: Pinnacle Studio 7 Editing, Pinnacle Express DVD/CD burning, Win DVD 4, Veritas Record Now,
- Region Coding software and DVD disk utilities
- Includes DVD-RAM, DVD-R, CD-RW & CD-R Media
- Includes cables & accessories

**\$575** MPFAM025



## Panasonic LCD Monitors

**3 YEAR WARRANTY**

### PanaView 15" LCD

The PanaView 15" LCD with direct composite & S-VHS inputs allow you to watch movies, view photographs, play games, listen to music while you work & play.

- 15" TFT-LCD
- 0.297mm Pixel Pitch
- 16.7M Colours
- Up to 1024x768
- Contrast Ratio 350:1
- 140(W) x 266(H) x 20(D)mm
- Weighs 4kg
- Built-in speakers
- Black or silver colour option



**\$539** MPFAM016

### PanaView 17" LCD

The PanaView 17" LCD provides exceptional clarity and brightness. Optional TV tuner module is available to watch TV without the need of a PC.

- 17" TFT-LCD
- 0.284mm Pixel Pitch
- 16.7M Colours
- Up to 1280x1024
- Contrast Ratio 450:1
- 420(W) x 355(H) x 57(D)mm
- Weighs 7kg
- Built-in speakers
- Black or silver colour option



**\$999** MPFAM017

### TV Tuner Module for 17" LCD

Now you can use your 17" PanaView LCD monitor as a TV. With the easy installation of the optional TV Tuner card, the PanaView 17" LCD becomes a complete, all in one TV. No PC, no external boxes, no special cables. Easily portable, the TV tuner makes the 17" PanaView LCD an ideal 2nd TV for another room, car or even boat as the PanaView 17" also accepts direct DC current.



**\$155** MPFAM026

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## Speakers

### Creative Inspire 4.1 4400

This incredibly powerful speaker system features four newly designed satellites with unique contours around the drivers for optimum sound dispersion

- 4.1 Channel Audio
- 17W RMS Subwoofer/6W RMS Satellite (Total 47W)
- 40Hz - 20kHz Frequency Response
- Includes remote control
- Combine with 4-channel SoundBlaster card to experience EAX sound



**\$135** HMCC695 Inspire 2.1 2400 **\$145** HMCC693

### Creative Inspire 6.1 6600

With full 6.1 support from Audigy™ 2, Inspire 6.1 allows you to maximize your desktop entertainment with Dolby® Digital EX encoded movies, enhanced EAX® and MS DirectSound® 3D effects in games.

- 6.1 Channel Audio
- 22W RMS Subwoofer/8W RMS Satellite
- 20W Centre (Total 82W)
- 40Hz - 20kHz Frequency Response
- Includes desktop and center speaker stands



**\$275** HMCC691 Inspire 5.1 \$200 **\$195** HMCC699

### Creative Inspire 5.1 Digital 5600

Complete and affordable Dolby Digital Home Theater System for your DVD player and game console. The Creative Inspire 5.1 Digital 5600 satisfies all your modern entertainment needs.

- 5.1 Channel Audio
- Dolby DTS decoder unit
- 24W RMS Subwoofer/8W RMS Satellite (Total 48W)
- 35Hz - 20kHz Frequency Response
- Desktop and center speaker stands, optical cable provided



**\$435** HMCC692

### Altec Lansing AVS500B

The compact AVS500B is a solid entry-level surround system that will instantly improve the way your PC sounds.

- 40Hz - 22kHz Frequency Response
- 6.1W RMS Subwoofer/2.2W RMS per Satellite
- 4.1 Channel Speakers
- 17W RMS Total Power Output
- Built in controls



**\$125** HMAL7013

### Altec Lansing 251

Large 3-inch drivers, and a center channel deliver a full range of movement and sound into the theatre-like atmosphere. Whether your genre ranges, movies, the 251 is an excellent all-round system.

- 5.1 Channel Speakers
- 25W RMS Subwoofer/7.4W RMS Center
- 2x6.5W RMS Front/2x1.2W RMS Rear
- 60W RMS Total Output Power
- 22Hz - 22kHz Frequency Response



**\$215** HMAL7018

### Altec Lansing XA3051

Top-of-the-line video gaming system features a center channel, a powerful subwoofer, and surround sound that put your TV's speakers to shame. Feel the bass. Unleash the power.

- 5.1 Channel Audio
- 18.25W RMS Subwoofer/17.5W RMS Center
- 5W RMS Satellite (Total 50W RMS)
- 6 Speaker Dolby Surround Pro Logic
- Dual headphone jack & Wall Brackets
- Auxiliary Input (for DVDs, PS2, Xbox etc)
- & Color coded cables



**\$295** HMAL7022

## Logitech

### Cordless Access K/B

- Access favorite websites & applications with iTouch keys
- Control audio and video from keyboard
- Zero-degree tilt design
- 2 metre range powered by 2xAAA batteries (included)
- USB & P/S2 adaptor



Cordless Access Duo

**\$85** IOLG0650

### Cordless Scroll Mouse

- Scroll wheel for easy navigation
- Three customizable buttons
- Sleek, comfortable shape fits in either hand
- 2xAAA batteries (included) last up to 4 months
- USB & P/S2 adaptor



**\$75** IOLG0636

### Corded Internet Navigator K/B

- Faster scrolling and application switching
- Access favorite websites & applications with iTouch keys
- Control audio and video from keyboard
- Ultra-flat zero-degree tilt design
- USB & P/S2 adaptor



Cordless Navigator Duo

**\$55** IOLG0642

### Cordless Optical Mouse

- Up to 800-dpi optical sensor for twice the speed, twice the accuracy



- Three customizable buttons and a scroll wheel
- Sleek & comfortable shape fits in either hand
- 2xAAA batteries (included)
- USB & P/S2 adaptor

**\$75** IOLG0641

### Corded Access K/B

**\$39** IOLG0656

### Corded Scroll Mouse

**\$35** IOLG0638

**\$155** IOLG0643

### Corded Optical Mouse

**\$39** IOLG0638

### Logitech MX 300 Optical Mouse

- Most advanced optical system at 800dpi provides unparalleled accuracy
- Quick Switch allows you to move between applications with i-Touch
- High resolution scroll wheel
- USB & P/S2 adapter



**\$55** IOLG0649

### Marble Mouse

- Precise fingertip control with four buttons
- Optical technology for smooth precision and resistance to dirt
- Finger-operated trackball for superior control and reduced hand and wrist movement
- Sleek shape flexible enough to use in either hand
- USB & P/S2 adaptor



**\$49** IOLG0609

### Precision USB Gamepad

- 6 programmable buttons and an 8-way D-pad
- Convenient plug and play USB interface
- Start playing right away with pre-configured game profiles for hundreds of popular PC and Mac games
- Mounted the shift button to double the amount of buttons



**\$25** IOLG0655

### Extreme Digital 3D

- 7 programmable buttons
- Multiple hand grip positions for comfort and control
- Twist Handle (for rubber & direction control)
- Single Centring Spring
- Stable Base with steel weight plates to stop joystick moving around
- High-precision throttle provides accurate power settings
- USB or Game port



**\$65** IOLG0656

### Formula GP Wheel

- 10" racing wheel with rubber hand grips
- 2 wheel-mounted gear shifters and 4 programmable buttons
- Dual Clamping System to hold wheel base tight and secure
- Realistic gas and brake pedals mounted on a weighted base
- Plug and play USB connection
- PC & MAC Compatible



**\$79** IOLG0657

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**SMC Networks**

SMC's mission is to connect people and organizations with a comprehensive portfolio of networking solutions while delivering best of breed technology.

**\$49**  
each

**CRAZY PRICE!!**

## EZ Connect Wireless Cardbus Adaptor



(SMC2435W)

The EZ Connect Wireless Cardbus Adaptor is a high performance and cost-effective 2.4GHz 11 Mbps wireless device for your PCMCIA Type II laptop.

- 802.11b compliant & Wi-Fi certified
- 11Mbps Wireless Cardbus Adaptor
- IEEE 802.1x for user authentication
- NEW Wi-Fi Protected Access (WPA) security
- High transmission power up to 100 mW

**CRAZY PRICE!!**

## Ethernet Dual Speed Switch



5, 8, and 16-port 10/100 full duplex, auto-sensing ports.

- Dual-speed 10/100Mbps with auto-sensing ports
- Run blazing speeds of up to 100Mbps
- Receives and transmits traffic at full wire speed on all ports

- 5-Port (SMC-EZ6505TX) **\$41** NWSMC008  
8-Port (SMC-EZ6508TX) **\$50** NWSMC006  
16-Port (SMC-EZ6516TX) **\$115** NWSMC007

## Wireless Turbo II/22Mbps (802.11b+)

The EZ Connect Turbo II/22Mbps series is the next evolution in 2.4GHz wireless communication. This new series provides the speed, coverage, and security expected by today's wireless users. The EZ Connect Turbo series doubles the standard 802.11b wireless communication to 22Mbps and remain compatible with existing 802.11b networks.

### EZ Connect Wireless Turbo Adaptors

- Data rates up to 22Mbps
- Utilizes Direct Sequence Spread Spectrum (DSSS) to prevent down time
- 64/128/256-bit WEP encryption



(SMC2435W)

PCI Interface **\$105** NWSMC023

Cardbus Type II **\$85** NWSMC024

## Wireless g 54Mbps (802.11g)

The Wireless g 54Mbps series is another cutting edge introduction in 2.4GHz wireless communication. This series provides the speed, coverage, and security expected by wireless users. Based on the 802.11g standard, the Wireless g series is 5 times faster than the widely used 802.11b wireless networking devices and is 100% compatible with existing 802.11b wireless networks.

### EZ Connect Wireless g Adaptors

- Data rates up to 54Mbps
- Up to 3x more throughput in mixed-mode networks and up to 50% throughput improvement in 802.11g networks
- 64/128-bit WEP encryption



(SMC2435W)



(SMC2435W)

PCI Interface **\$165** NWSMC027

Cardbus Type II **\$145** NWSMC025

## EZ Connect Turbo Wireless Access Point / Bridge

Designed to connect two or more separated Local Area Networks, the easiest alternative to a traditional wired network.

- Auto-Sensing 44/22/11Mbps
- Web Based Management
- Point-to-Point, Point-to-Multi-Point connectivity
- Utilizes Direct Sequence Spread Spectrum (DSSS) to prevent down time
- 64/128/256-bit WEP encryption
- Supports up to 253 users



(SMC2482W)

**\$259** NWSMC028

## Barricade g Wireless Broadband Router

Share your high-speed broadband connection with this platform independent multi-functional router.

- Auto-Sensing 54/11Mbps
- 4-port dual-speed 10/100 switch
- PROSM Micro™ technology provides 50% more throughput
- Built-in Stateful Packet Inspection (SPI) firewall security
- Wi-Fi Protected Access (WPA) for data security
- 802.1x for user authentication
- Supports up to 253 simultaneous users
- Web management and Telnet/BigPond/Optus Cable support



(2804WBK)

**\$299** NWSMC029

## Broadband Routers

### Barricade Router

The perfect option to connect multiple PCs to a high-speed broadband Internet connection or to Ethernet back-bone

- 4-port 10/100Mbps dual-speed switch
- RS-232 port for Auto Fail-over to 56K modem dial-up
- Built-in print server
- Supports up to 253 simultaneous users
- Web management and Telnet/BigPond/Optus Cable support



(SMC7004ABR)

**\$210** NWSMC035

### Barricade Wireless Router

An all-in-one networking solution for the home & business.

- 3-port 10/100Mbps dual-speed switch
- Data rates up to 11Mbps for wireless
- RS-232 port for Auto Fail-over to 56K modem dial-up
- LAN & WAN addresses auto-assigned and easily managed
- 64/128-bit WEP encryption & MAC address filtering
- Built-in NAT firewall security
- Built-in print server
- Supports up to 253 simultaneous users
- Web management and Telnet/BigPond/Optus Cable support



(SMC7004ABWR)

**\$249** NWSMC038

### Barricade VPN Router

Remotely access a network securely by establishing an authenticated and encrypted tunnel over the Internet. You can be well assured that your data is being transmitted and exchanged in the most secure manner.

- 4-port 10/100Mbps dual-speed switch
- Robust Stateful Packet Inspection (SPI) firewall feature
- Built-in VPN tunnel (IPsec/PPP Client & Server) support
- Built-in DHCP server to auto-assign IP addresses
- Supports up to 253 simultaneous users
- Web management and Telnet/BigPond/Optus Cable support



(SMC7004FWR)

**\$170** NWSMC032

## Gigabit Networking

### EZ Card 1000 Copper PCI Card

Designed for high performance workstations that want a faster solution than today's 10/100 adaptors.

- 10/100/1000Mbps
- Supports full duplex to maximize speed
- Virtual Cable Tester (VCT) for advanced cable diagnostics
- Wake-On-LAN
- 802.3x flow control
- 802.3x VLAN
- 802.1p QoS



(SMC-EN1408T) or equivalent

**\$56** NWSMC030

**CRAZY PRICE!!**

### EZ Switch 10/100/1000

SMC's EZ Switch 10/100/1000 provides a seamless migration to higher-speed networking while solving bandwidth issues.

- 10/100Mbps half or full-duplex, or 1000Mbps full-duplex ports
- Support to handle Jumbo Packets up to 9K bytes packet
- Store-and-forward mode with wire-speed filtering and forwarding rates



- 5-Port (SMC8505T) **\$235** NWSMC031  
8-Port (SMC8508T) **\$355** NWSMC032

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## Printers / Scanners

### hp photosmart I200

- Take the scanner wherever you go, slim size 267(W) x 177(D) x 30(H)mm
- 36-bit Colour flatbed up to 1200x1200 dpi
- Save scans to memory card - no PC required
- CF & SD/MMC card slot
- 4 x AA batteries or USB bus powered
- USB Interface



**\$235** I0HP0060

### hp deskjet 5652

- 4800x1200 dpi Print Resolution
- Up to 12ppm Black & 15ppm Colour
- hp PhotoREt 3
- 6MB Memory
- ISO sheet tray
- USB & Parallel Interface



**\$275** PHPP0183

### hp officejet 4110

- All-in-one: print, fax, scan, copy
- 4800 optimised dpi colour
- Prints & copies up to 12ppm Black & 10ppm Colour
- 36-bit scanning up to 600x1200 dpi
- 33.6kbps fax (does not require PC)
- USB Interface



**\$295** PHPP0184

### Epson Perfection I260 Photo

- 48-bit colour
- Up to 1200 dpi (2400 dpi sub-scan)
- Optional Transparency Unit for 35mm film negatives/slides
- Single button operation and full auto mode
- Bundled with photo editing, OCR
- USB Interface



**\$225** I0EP0101

### Epson Stylus C430UX

- 2880x1200 dpi Print Resolution
- Up to 12ppm Black & 5.4ppm Colour
- ISO sheet tray
- USB Interface
- USB cable included



**\$99** PHPP0059

### Samsung ML I510

- Up to 600 x 600 dpi Print Resolution
- Up to 14ppm Black
- 200 RAM
- 60MHz Print Processor
- 250-Sheet Paper Tray
- USB Interface



**\$345** PHSM0028

## Canon Digital Cameras

### PowerShot A300

The PowerShot A300 is the perfect entry level digital still camera for photographers seeking ease of use without compromising on image quality.

- 3.2 MegaPixel @ 2048x1536
- Video capture @ 640x480 with audio
- 3.1X digital zoom
- 1.5" TFT Screen
- 16MB Compact Flash Card
- 2 x AA NiMH batteries
- USB Interface
- 110(W) x 58(H) x 36.4(D)mm
- Weights 175g



**\$475** I0CAN060

### PowerShot Digital IXUS V3

With the PowerShot Digital IXUS V3, good looks and striking image quality go hand in hand.

- 3.2 MegaPixel @ 2048x1536
- Video capture @ 640x480 with audio
- 2X optical zoom
- 3.2X digital zoom
- 1.5" TFT Screen
- 16MB Compact Flash Card
- Li-ion battery
- USB Interface
- 87(W) x 57(H) x 26.7(D)mm
- Weights 180g



**\$675** I0CAN036

### PowerShot Digital IXUS 400

The PowerShot Digital IXUS 400 offers high resolution shooting with the ability to also capture up to 3 minutes of continuous movie recording with audio.

- 4 MegaPixel @ 2272x1704
- Video capture @ 320x240 with audio
- 3X optical zoom
- 3.6X digital zoom
- 1.5" TFT Screen
- 32MB Compact Flash Card
- Li-ion battery
- USB Interface
- 87(W) x 57(H) x 27.8(D)mm
- Weights 185g



**\$975** I0CAN041

## hp Digital Cameras

### photosmart 735

For a perfect mix of compact size, high image quality and ease-of-use, the hp photosmart 735 is the one to have.

- 3.2 MegaPixel @ 2048x1536
- Video capture with audio
- 3X optical zoom
- 4X digital zoom
- 1.5" TFT Screen
- 16MB internal memory
- SD & MMC Card Slot
- 2 x AA batteries
- USB Interface
- 105(W) x 71(H) x 46(D)mm
- Weights 235g



**\$575** I0HP0057

### photosmart 935

The hp photosmart 935 offers superior image quality with patented hp Imaging Technology, which ensures clear, crisp images whatever the occasion.

- 5.1 MegaPixel @ 2400x1952
- Video capture @ 288x208 with audio
- 3X optical zoom
- 7X digital zoom
- 1.5" TFT Screen
- 32MB SD Card included
- SD & MMC Card Slot
- 2 x AA batteries
- USB Interface
- 97(W) x 67(H) x 45(D)mm
- Weights 230g



**\$945** I0HP0058  
**Bonus Docking Station**

### photosmart 850

With the hp photosmart 850, you have the confidence to frame and capture every moment in its truest and sharpest form.

- 4.13 MegaPixel @ 2272x1712
- Video capture @ 288x216 with audio
- 8X optical zoom
- 7X digital zoom
- 2" TFT Screen
- 32MB SDRAM, 4MB Flash, 16MB SD Card included
- 4 x AA batteries
- USB Interface
- 114(W) x 83(H) x 85(D)mm
- Weights 380g



**\$1295** I0HP0059

## Logitech Webcam / Digital Camera

### QuickCam Express

Easy to use and economical. Great for video e-mails and face-to-face video calls.

- Still image capture up to 640 x 480 pixels
- Video capture up to 30 frames/sec @ 320 x 240
- USB Interface



**\$79** I0LG0822

### QuickCam Messenger

Still image & video capture up to 640 x 480 pixels with built-in microphone.

**\$95** I0LG0845

### ClickCam 310

2MB memory stores up to 160 photos and 15 seconds of video.

- Digital camera at up to 352 x 288 pixels
- Video capture at 15 frames/sec up to 176 x 144
- Webcam up to 640 x 480 pixels
- Video conferencing up to 30 frames/sec
- 10 second self timer
- 4 x AAA batteries included
- USB Interface



**\$115** I0LG0843

### Pocket Digital

As small as a credit card, but it has all the features you want: high resolution, plenty of memory, and easy downloading.

- Simple point-and-shoot camera
- 16MB memory stores up to 52 high resolution images at 1.3 megapixels
- See both bright lights and dim details with AutoWhite technology
- USB Interface, recharge via USB cable



**\$215** I0LG0847

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Unlimited Broadband 256/64K ADSL is available in Sydney, Melbourne, Brisbane, Canberra, Adelaide and Perth metro areas. \* Modem is by delivery only with a \$10 freight fee. A Free USB ADSL modem is available with the purchase of Unlimited Broadband Pack only - limited offer. # Conditions apply including minimum 12 month plan, once-off \$159 setup fee and \$69.95 monthly fee. Total minimum cost for first 12 months is \$998.40, thereafter minimum cost for each 12 months is \$839.40. Prices are subject to change without prior notice. Valid credit card required. Paid quarterly in advance. Subject to availability. Visit [www.tpg.com.au](http://www.tpg.com.au) for full terms and conditions.



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